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THE FEED-LIVESTOCK ECONOMY OF EASTERN EUROPE: PROSPECTS TO 1980



FOREIGN AGRICULTURAL ECONOMIC REPORT NO. 90 ECONOMIC RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE



ABSTRACT

During the rest of the 1970's, the agricultural sectors of the seven East European countries will continue to be directed towards increasing livestock output to meet rising consumer demand for livestock products. Increasing livestock output began to receive emphasis in the late 1960's. To achieve their goal, the countries are building a feed base capable of supporting increased livestock production.

Apart from meeting increased per capita meat consumption, which is projected to grow at an average annual rate of nearly 2-1/2 percent through 1980, increased production will enable the region to remain a net meat exporter of about 680,000 metric tons throughout the 1970's. Because of rapidly expanding grain production, Eastern Europe's grain imports are expected to diminish from 4.4 million metric tons in the late 1960's to 3.0 million by 1980. However, oilseed cake and meal imports will reach 3.7 million metric tons annually by 1980, compared with an average of 1.5 million annually during 1966-70. The outlook for U.S. exports of oilseeds to the region is excellent, especially for soybeans; the outlook for grains is fairly good as the U.S. share in the region's grain imports is likely to increase.

The agricultural situation in Eastern Europe in the 1970's will be a continuation of the considerable expansion that occurred during the 1960's. This expansion is based on past changes in institutional and economic factors which have led to an improved economic climate. Among these changes are the liberalization of the marketing system, more realistic central planning, increased agricultural investments and producer prices, and continued subsidization of consumer prices.

Keywords: Eastern Europe, agricultural production, food consumption, grains, oilseeds, meats, agricultural projections, 1980.

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FOREWORD

This report presents results of a study analyzing and projecting to 1980 the feed-livestock economy of Eastern Europe. Special emphasis is put on demand and trade potential of meats, grains, and oilseed feed products and on competitive relationships among the principal livestock feeds.

The study was conducted by a team of economists which included H. Christine Collins, James R. Horst, Thomas A. Vankai, Linda Bernstein Schneider, and William H. Ragsdale. Francis S. Urban directed the study and wrote portions of this report.

Detailed individual country studies are in progress. These studies will build on the data and methodologies developed in this report but--because of later information and more recent policy changes--the individual studies may produce somewhat different results.

Joseph W. Willett, Director

Foreign Demand and Competition Division

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Economic Research Service

UNITS OF MEASURE, DEFINITIONS, AND EXPLANATORY NOTES

Metric units are used throughout this report:

One metric ton = 2,204.6 pounds
One quintal = 100 kilograms
One kilogram = 2.205 pounds
One hectare = 2.471 acres.

Livestock products -- meat, milk, and eggs.

Meat--subdivided into beef and veal, mutton and lamb, pork, and poultry.

Feeds--concentrates and roughages.

Concentrates--grains and protein meals.

<u>Protein meals</u>—subdivided where possible into oilseed meal and cake, fishmeal, and meat meal.

Roughages--corn silage and green feed, hay, fodder beets, potatoes, and permanent pastures.

Underscored numbers in parentheses refer to items in Literature Cited, at the end of this report. Unless otherwise specified, a dash (--) is used in tables to mean nil or negligible quantities. NA means not available. Individual items in tables may not equal total because of rounding.

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SUMMARY

During the 1970's, Eastern Europe is expected to remain an important market for grains and a growing market for U.S. feed grains, although the total grain import requirement of the region may contract slightly from 1966-70 levels. The region will also require increasing imports of oilseeds and oilseed feed products. A traditional exporter of livestock products, Eastern Europe is likely to maintain a high level of exports of live cattle, and beef and pork products.

In 1980, net grain imports of the three northern countries—Czechoslovakia, East Germany, and Poland—are projected at 5.7 million tons, down only a little from the annual average of 6.0 million tons in the 1966-70 base period. However, the composition of these imports is expected to change. The proportion of feed grains, which in the base period made up one—third of all grain imports, will increase, while that of wheat will decrease. The four southern countries—Bulgaria, Hungary, Romania, and Yugoslavia—may increase their exportable grain surplus from 1.6 million tons annually in the base period to 2.7 million tons in 1980. Thus, the net grain import requirement of the whole region is expected to be about 3.0 million tons in 1980, compared with the yearly average of 4.4 million tons in 1966-70.

Previously planned and initiated expansion and improving efficiency in the livestock sector will result in increased demand for protein animal feeds, particularly oilseed cake and meal, beyond the potential of domestic production. Consequently, a rapid increase of imports of oilseed feed products is projected—from 1.4 million tons (meal equivalent) annually in the base period to 3.6 million tons in 1980. Import demand will be strong in the northern as well as the southern countries.

Despite an expected continuation of growing domestic demand for livestock products, the region will remain a net exporter of live animals and meat, shipping a projected 684,000 tons (carcass weight equivalent) in 1980, up from an average of 417,000 during 1966-70. Poland, Hungary, and Yugoslavia will supply about 85 percent of these exports. Czechoslovakia will remain a net meat importer. Because the region's chronic shortage of foreign exchange is unlikely to lessen substantially through 1980, meat exports will be essential for East European countries to maintain high levels of imports of high protein feeds.

The above projections must be qualified as follows: First, because of large weather variations in Eastern Europe, grain projections are valid only as indicative of a trend. In any particular year, large deviations from the trend may be expected. Second, in view of the region's foreign exchange situation, the southern countries are likely to substitute some grain area for oilseed area, and to feed more grain and less oilseed meal to livestock at some expense of livestock feeding efficiency. Consequently, actual imports of oilseed products by these countries, and their grain surpluses, may be lower than projected. At the same time, total grain imports of the region may be correspondingly higher. Third, projected meat consumption assumes that high consumer meat price subsidies, prevalent up to now, will be

maintained in the future. There are indications, however, that some or all East European governments are planning to lower these subsidies. If they succeed, the present high rate of growth of meat consumption may slow and meat exports could be larger than projected, depending on foreign markets for these exports.

The study results imply that during the 1970's the United States can significantly increase exports of oilseeds and oilseed cake and meal to Eastern Europe. These shipments averaged only 320,000 tons (meal equivalent) in 1966-70. Also, despite the slightly contracting market for grains in the region, its takings of U.S. grains are expected to increase substantially from the 1.1 million tons a year during 1966-70. The increase would be due to the continued heavy import demand for grain in the northern countries, the shifting composition of this demand towards feed grains and away from wheat, probable grain shortages in the Soviet Union--which in the past supplied most of the region's import demand for grains--and the continued absence of grain trade between the northern and the southern countries.

With respect to U.S. imports, purchases of meat from Eastern Europe, particularly of pork products, will increase because of increased supplies in the region and trade liberalization policies of the two sides.

The study's general economic projections indicate that Eastern Europe's population of 123.5 million in 1970 will increase 0.8 percent annually, reaching 133.2 million in 1980. During the 1960's, average per capita income increased over 5 percent annually. This rate is expected to accelerate slightly during the 1970's. These projections were used as general assumptions in making the commodity projections, which are based on detailed analysis of the demand for and supply of livestock products, grains, oilseeds, and roughages. Official country plans and targets for 1971-75 were also taken into account. Feed demand projections are a function of projected livestock production or livestock numbers, estimated feeding rates, and assumed improvement in feeding efficiency. Also considered was the likely impact of recent reforms in the agricultural sector, recent price movements, existing subsidies and controls, and the improving quality of diets.

Among the policy decisions that are reshaping the region's agriculture is the major drive to spur grain production to provide a basis for increasing domestic livestock feed supplies and reducing the drain of foreign currency reserves. Initiated in the early 1960's, these efforts improved the feed base so that by the late 1960's the countries could shift emphasis from grains to increased production of livestock products. However, self-sufficiency in grain production has remained the longer term goal.

Also in the late 1960's, there was a general shift in emphasis from quantity of production to quality and efficiency. For example, there was increased investment in agriculture, abolition of compulsory deliveries, increased farm prices for livestock products, some decentralization of marketing, and increased reliance on profits, prices, and specialization in production.

As a result of these policies, production during the decade increased considerably. In the 1970's, production rates are expected to remain high but will gradually taper off. Except for oilseeds, production will generally grow faster than consumption, despite continued subsidization of food prices.

Per capita meat consumption in Eastern Europe is projected to increase through 1980 at an annual rate of about 2-1/2 percent a year, rising more rapidly in the poorer southern countries than in the northern countries. In Czechoslovakia, where consumption levels approach West Germany's, the increase will be from 61 kilograms per capita in 1966-70 to 80 kilograms in 1980. In Yugoslavia, where consumption levels are the lowest, the increase will be from 30 kilograms to 39 kilograms. For the region, up to 1975, production will be growing faster than consumer needs, leaving a larger amount for export. Thereafter, net exports will probably stabilize.

Consumption of grains for food will decrease in all countries of the region. On a per capita basis, the rate of decrease during the 1970's will be nearly 1 percent annually. In East Germany, where consumption is the lowest, the decrease will be from 124 kilograms in the base period to 117 kilograms in 1980. In Bulgaria, at the other extreme, it will be from 258 kilograms to 230 kilograms.

Total grain utilization in the region is expected to increase rapidly through 1975, at nearly 2-1/2 percent a year. After 1975, the increase will slow to less than 2 percent annually as the amount of grain fed to livestock per unit of product approaches the level prevalent in more advanced West European countries and the high rate of livestock production tapers off.

The best indication of Eastern Europe's rapidly improving livestock production is the recent sharp increase in the total oilseed and meal and cake requirement. This is projected to increase through 1980 at nearly 6-1/2 percent a year, while oilseed production will grow only 4 percent annually.

Grain, oilmeal, and meat balances in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980

	Total Eastern Europe		4,239	7001	₹.		ાઁ જ	5,492	0,	101	292	849	684
Meat 3/	Southern : countries $\frac{1}{4}$		1,609	2,401	3,177	-	1,432 659,1	2,005	3,193	177	308	544	276
	Northern countries $\frac{h}{4}$		2,630	, rV (Ĵ ο		~ e	3,487		91-	91-	107	108
	Total Eastern Europe	tons	706	•	1,004 2,206	-	1,094	2,745	5,798	1388	-725	l (J	-3,592
Oilmeal 2/	Southern : countries: $\frac{1}{4}$	1,000 metric to	472 610	85	1,548	-	495 848	1,253	99	- 23	1 1 238	1477-	-1,054
	Northern : countries: $\frac{h}{4}$	1,00	234 371	964	590 658		599 858	1,492	n en	1365	784-	-1,864	-2,538
	Total Eastern Europe		54,728 58,977	79,467	94,652 94,285		60,543 66,198	74,877	97,265	-5,815	-7,221	-3,941	-2,980
Grains $1/$	ω		29,312	033	41,031 52,859	C	29,908 33,395	38,417 45,192	50,184	-592	-761 1.615	2,645	2,675
	Northern :Southern countries:countries $\frac{4}{4}$		25,416	30,435	36,015 41,426		30,635	36,460	180,74	-5,219	-6,460	∞	-5,655
	Item	- No. 1 + 2 € 1	1956-60	1966-70	1980	Consumption:	1956-60	1966-70	80	Net trade: <u>5</u> / : 1956-60	1961-65	1975	1980

2/ Oilmeal and cake and oilseeds in oilmeal equivalent, 1/ Wheat, rye, buckwheat, rice, corn, barley, and oats. 2/ Oilmeal and cake and oilseeds in oilmeal equivalent, from all oilseeds used in animal feeding. 3/ Beef and veal, pork, mutton and lamb, and poultry meat as well as live animals, all in carcass weight equivalent, excluding offals. 1/ Northern countries are Czechoslovakia, East Germany, and Poland, and southern countries are Bulgaria, Hungary, Romania, and Yugoslavia. 1/ No sign indicates net exports; and a minus (-) indicates net imports.

Sources: Tables 18, 19, 22, 38, 39, and appendix tables 3 and 4.

Annual rates of growth of production and consumption of grains, oilmeal, and meats, Eastern Europe, 5-year averages for 1956-70 and projections to 1975 and 1980

Period : Worthern Southern Eastern countries Formation Formati	Oilmeal <u>2</u> /		Meats 3/	
2.9 4.2 3.6 2.6 2.6 2.7 2.8 2.0 2.2 1.8 1.4 2.8 2.8 2.5 1.8 2.5 2.5 1.6 2.5 1.6 2.1 2.8 2.5 1.9	Northern Southern : Total countries : Eastern : Europe	Northern Southern countries:	Southern countries	Total Eastern Europe
2.2 1.5 2.9 4.2 3.6 2.4 2.0 2.6 2.6 2.4 2.0 2.2 1.8 1.4 2.8 2.1 2.8 2.1 2.8 2.5 1.8				
2.2 1.5 2.8 2.6 2.6 2.4 2.0 2.6 2.4 2.0 2.2 1.8 1.4 2.8 2.5 1.8 2.1 2.8 2.5 1.8 1.6 2.1 2.8 2.5	Percent			
2.9 4.2 3.66 2.6 2.7 2.8 2.0 2.8 2.0 2.8 2.0 2.8 2.1 2.8 2.1 2.8 2.5 1.8 1.9 1.9				
2.9 4.2 3.6 2.6 2.6 2.6 2.1 1.8 2.1 2.8 2.5 1.8 2.5 2.1 2.8 2.5 1.6 2.5 1.6 2.5 1.6 2.5 1.6 2.5 1.6 2.5 1.6 2.5 2.1 2.9	5.2	2.5	4.1	3.1
2.8 2.0 2.2 2.2 2.2 1.4 2.8 2.5 1.8 2.5 2.3 2.4 1.9 1.6 2.1 2.3 2.4 1.9	9.9 6.9 0.5	3.4	7.0	3.7
2.0 2.2 2.2 2.2 3.3 2.4 3.5 3.5 3.5 3.1.8 3.4 3.5 3.5 3.4 3.5 3.5 3.4 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5	5.1	3.0	4.1	W. 77
2.2 1.8 2.1 2.8 2.5 2.5 2.3 2.4 1.6 2.1 1.9	5.1	2.7	3.5	3.1
2.2 1.8 2.1 2.8 2.5 2.5 2.3 2.4 1.6 2.1 1.9				
2.2 1.8 2.5 2.5 2.5 2.5 2.5 2.4 2.1 2.9 2.1 1.9				
2.5 2.3 2.4 2.5 2.1 1.9	11.4	2.0	3.0	2.3
.: 2.5 2.3 2.4 .: 1.6 2.1 1.9	8.2	3.2	9.0	3.4
1980: 1.6 2.1 1.9		2.9	7.0	3.2
	5.9	2.8	3.9	3.2
••				

1/ Wheat, rye, buckwheat, rice, corn, barley, and oats. 2/ Oilmeal plus oilseeds and oil cake in oilmeal equivalents. 3/ Beef and veal, pork, mutton and lamb, and poultry, in carcass weight equivalent excluding offals and fats.

Source: Table 50.



THE FEED-LIVESTOCK ECONOMY OF EASTERN EUROPE: PROSPECTS TO 1980

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I. INTRODUCTION

East European Economy and Agricultural Trade

As defined for this study, Eastern Europe comprises Czechoslovakia, East Germany, Poland, Bulgaria, Humgary, Romania, and Yugoslavia. The region covers an area of 1,247,000 square kilometers (481,000 square miles) with a population of 123.5 million in 1970 (tables 1 and 2). Eastern Europe is slightly larger than the European Community of six countries (EC-6), and its population is two-thirds that of EC-6. $\underline{1}/$

Eastern Europe is not a homogenous region, encompassing as it does a wide variety of topographical and climatic conditions, cropping patterns, and levels of economic development. Its unifying factors are the similarities of political systems and economic policies of the seven countries, 2-1/2 decades of preferential trading among them and with the Soviet Union, and dependence on the Soviet Union for mineral fuels and other raw materials. 2/

With regard to agriculture, the region can be roughly divided into two subregions, the first three countries—the northern countries—being grain importers and the latter four—the southern countries—being largely grain exporters.

^{1/} EC-6 covers an area of 1,171,000 square kilometers and in 1970 had a population of 188.7 million. The six countries are Belgium, France, Italy, Luxemburg, the Netherlands, and West Germany. In January 1973, the Community was enlarged to nine nations (EC-9) when Denmark, Ireland, and the United Kingdom became members. The enlarged Community covers an area of 1,528,000 square kilometers with a population (1970) of 252.6 million.

^{2/} The mineral resource base of Eastern Europe is generally weak; imports of large quantities of raw materials are needed to support industrial activity. Exceptions are the coal and sulphur deposits in Poland, petroleum in Romania, bauxite in Yugoslavia and Hungary, copper in Yugoslavia, and potash in East Germany, which supply domestic needs as well as exports. However, Romanian petroleum, and East German potash exports can supply only a fraction of the total needs of the region. In addition, Czechoslovakia and East Germany are nearly self-sufficient in coal, antimony, and magnesite; and Poland, in lead-zinc ores. Romania seems to have potentially valuable deposits of copper, lead, zinc, bauxite, manganese, bismuth, mercury, silver, iron ore, and coal. Small quantities of other minerals are mined throughout the region (95).

Table 1--Eastern Europe's population in 1970 and projections to 1975 and 1980

Country :	1970 <u>1</u> /	: : 1975 :	: : 1980 :	: Annual rate : : : 1961-70 : : :	e of growth 1971-80
:		Thousands	3_	Perce	ent
Czechoslovakia East Germany Poland	14,334 17,058 32,473	14,800 17,100 34,000	17,100	-0.1	0.5 0 1.0
countries:	63,865	65,900	68,000	0.6	0.6
Bulgaria	8,490 10,329 20,250 20,538	8,800 10,500 21,400 21,700	10,700 22,600	0.3 1.0	0.7 0.4 1.1 1.1
countries:	59,607	62,400	,		0.9
Total Eastern Europe :	123,472	128,30	133,200	0.7	0.8

 $[\]underline{1}$ / On June 30.

Sources: $(\underline{6}, \underline{92})$.

Table 2--Total area and population density, 1970, and land use, average 1961-65, Eastern Europe

		:	:	Land use	9	
Country	Total area	Population per sq. km.	Arable land gardens, orchards, & vineyards	grasslands.	. &	Nonagri- cultural land & inland waters
	1,000 sq. km.	No.		1,000 sq. k	cm.	
Czechoslovakia East Germany Poland	108.3	112 158 104	50.3 50.3 159.4	17.9 14.2 41.9	44.4 29.5 79.5	15.3 14.3 30.9
Bulgaria Hungary Romania Yugoslavia	93.0 237.5	77 111 86 80	45.7 56.4 105.0 83.4	12.0 13.4 42.5 64.3	36.1 14.0 63.9 86.9	17.1 9.2 26.2 21.2
Total	1,245.1	99.2	550.5	206.2	354.3	134.2
			Percer	nt _		
Czechoslovakia East Germany Poland	100.0	<u>1</u> / <u>1</u> / <u>1</u> /	39.3 46.5 51.2	14.0 13.1 13.4	34·7 27·2 25·5	12.0 13.2 9.9
Bulgaria Hungary Romania Yugoslavia	100.0	1/ 1/ 1/ 1/	41.2 60.6 44.2 32.6	10.8 14.4 17.9 25.1	32.6 15.0 26.9 34.0	15.4 10.0 11.0 8.3
Total	100.0	<u>l</u> /	44.2	16.6	28.4	10.8

^{1/} Not applicable.

Sources: $(\underline{6}, p. 5; \underline{8}, p. 11)$.

The size of the combined economies of Eastern Europe is relatively modest compared with economies of principal developed regions. In 1970, combined gross domestic product (GDP) of the seven countries was estimated at \$149 billion, compared with \$143 billion for France, \$984 billion for the United States, and \$314 billion for the Soviet Union. GDP ranged from about \$10 billion in Bulgaria, the region's smallest country, to \$39 billion in Poland (table 3).

With the exception of East Germany and Czechoslovakia, East European economies before the Second World War were primarily agricultural. They are today largely industrial and dependent on agricultural imports. Over half of the region's population lives in urban centers, and the proportion of the economically active population engaged in nonagricultural activities ranges from 48 percent in Romania to 86 in East Germany (1970 data). The agricultural sector's contribution to GDP is smallest in East Germany, about 9 percent, and largest in Poland, 24 percent. 3/

Crops account for about three-fifths of the value of gross agricultural production. Livestock's share has increased slightly since 1960. In the 1960's, grains occupied about 56 percent of arable land--19 percent in wheat (primarily winter wheat), 14 percent in corn, 11 percent in rye, and 12 percent in other grains (barley, oats, rye, and buckwheat). In the northern countries--Poland, East Germany, and Czechoslovakia--rye occupies 40 percent of the grain area and is the leading grain after wheat. Corn leads in the southern countries--Hungary, Bulgaria, Romania, and Yugoslavia--with 44 percent of the grain area. Forage crops are grown on 16 percent of the region's arable land, followed by potatoes on 9 percent. Sugar beets and rape are the major industrial crops in the northern countries, and sunflower leads in the southern countries. Orchards and vineyards occupy about 6 percent of the region's arable land (18).

In 1965-69, Eastern Europe exported an average of \$2.7 billion worth of food and other agricultural products per year and imported about \$3.3 billion worth. This represents less than a third of the value of agricultural exports and about a fourth of the value of agricultural imports of EC-6. Eastern Europe generally imports grains and animal feeds, and exports meats, meat products, and live animals.

In the same 5 years Eastern Europe took about 6 percent of world grain imports, 8.5 percent of oilseed and oilseed cake and meal imports, and over 12 percent of meat meal and fishmeal imports. It supplied 13 percent of world cattle exports, 25 percent of sheep exports, over 7 percent of hog exports, and close to 7 percent of meat and meat product exports (16; 28, 1970).

Eastern Europe's share of U.S. agricultural trade has been relatively minor. During 1965-69, the region received an annual average of 2.5 percent of U.S. agricultural exports, amounting to \$157 million a year, and supplied 1.7 percent of U.S. agricultural imports, amounting to \$73 million. While recently, U.S. farm exports to Eastern Europe have tended to decline, U.S. farm imports from the region have been increasing (17).

^{3/} See table 3, footnote 2.

Table 3--Gross domestic product and its origin by economic sector, and distribution of population by urban, rural, nonagricultural, and agricultural classification, Eastern Europe and selected West European countries

	que	: Ori	Origin of GDP	2/	Total po	Total population 1/:	ECO	ly active
Country	at factor	Industry :Agricul-:	:Agricul-:	Other	us d'an	Rural	Nonseri - Agri	tion 1/
		crafts	forestry.					
	Billion				Percent			
Czechoslovakia	26.9	45.0	12.4	42.6	62	38	81	19
East Germany	29.3	50.8	8.7	40.5	1 √	56	98	77
Poland	39.1	36.0	24.2	39.8	52	748	63	37
Bulgaria	9.5	42.7	15.6	41.7	52	78	62	38
Hungary	12.5	36.0	20.6	43.2	94	54	71	53
Romania	18.7	32.9	22.0	45.1	41	59	748	52
Yugoslavia	12.8	37.2	22.6	40.2	35	65	52	78
				,				
France	143.0	35.2	7.0	57.8	70	30	98	1,4
Italy	300.5	27.0	12.6	0.09	51	64	80	20
West Germany	: 172.5	39.2	4.3	56.5	82	18	91	0

other branches of the economy. If a uniform pricing criteria were applied to all products, the share of agriculture in GDP would increase 50 to 100 percent, depending on the country ($9\underline{I}$, p. 19). 1/1970. 2/1967. By market economies standards, percentages for Eastern Europe are probably too low for agrinational income calculations, agricultural products are consistently undervalued in relation to those in culture and forestry and too high for industry and handicrafts, since in the Socialist countries'

Sources: For all countries except Yugoslavia, (21) for GDP; (1, p. 54) and (69, p. 140) for origin of GDP; (9) for urban and rural population, and (91) for economically active population. For data on Yugoslavia, (73) and (74) The main U.S. trading partners in Eastern Europe have been Yugoslavia, Poland, and East Germany. Their agricultural imports have consisted mainly of feed grains, wheat, cotton, oilseeds and oilseed products, animal fats, hides and skins, and dairy products.

Objectives of the Study

The principal objective is to examine the relationships between livestock and livestock feed economies in Eastern Europe, and to determine the region's ability to meet its food consumption goals and its import requirements of grains and protein feeds through 1980. The study is directed to the following specific questions:

- --Factors determining the effective direct demand for livestock products, the derived demand for grains and other animal feeds, and the size of this demand.
- --Factors determining the supply of these products and the quantities supplied.
- --Supply-demand balance for the products involved, to determine probable import demand or export availability.

To establish the base for projection, economic characteristics and policies of the region are briefly assessed and estimates made for rates of population and national income growth. Differences in the quality of diet in Eastern Europe and in the more developed countries of Western Europe—whose diet levels the former countries are approaching—are also considered.

General Assumptions and Methodology

The focus is on the growth of demand for livestock products in Eastern Europe, the derived demand for principal animal feeds, and the potential of the region to produce the demanded quantities. On this basis, trade needs in the feed-livestock complex are also examined, assuming perfectly elastic foreign demand and supply.

The data base for the analysis is generally the 1956-70 period, but shorter time series were included whenever longer series were not available or analysis required it. The study relies heavily on East European sources, U.S. Agricultural Attaches' reports, and statistics and technical studies originating in international organizations.

Projections are made to 1975 and 1980, from a 1966-70 base. In making projections, we took official country plans into consideration, but the weight assigned to them differs from country to country, depending on their objectivity as measured by the historical performance of earlier plans. Population and national income projections were based on the work done by the Demographic Analysis Division of the U.S. Bureau of the Census. Because official foreign exchange rates of the national currencies appear highly

unrealistic, and those adopted in other studies differ widely, we projected national incomes in national currencies, using rates of growth projected by the U.S. Bureau of the Census and checking them against national plans. Only the rates for Yugoslavia were substantially increased above the Bureau's estimates to approximate more closely the recent performance of the country's economy.

Projections of demand for food items were based on projected population, national income, and income elasticities of demand. Demand for grains used for seed and industrial purposes was related to area planted and consumption of alcoholic beverages, respectively. To project feed consumption, six representative feedstuffs—grains, oilseed and fish meals, hay, corn for silage and green feed, fodder beets, and potatoes—were converted to cereal units. Factors were developed relating livestock production to feed requirements, and these factors were used as a base from which future feed requirements were projected.

Prices were not used directly in the demand analysis, because both producer and consumer prices in Eastern Europe are under government control, subsidies tend to obscure real price levels, and price data are often limited or poor in quality. Prices are important in that they may be administratively altered to allow attainment of planned consumption levels. Therefore, all consumption projections were compared with official government plans.

In projecting grain output to 1975 and 1980, we considered area and yield components separately. For the northern countries, yield projections of the individual grains were derived from multiple regression and correlation analyses, with yields being a function of the best fertilizer input combined with selected monthly weather variables (soil moisture or rainfall for particular months). For the southern countries, linear time trends were applied to historical yield data.

Area projections for all seven countries were based on time trends. In addition, linear trend analysis was applied to pasture area. Linear trend analysis was applied to production of feedstuffs—hay, feed beets, potatoes, corn for silage and green feed, and oilseeds used in protein meals. These and all other production projections were compared with the official plans of each of the countries for reasonableness.

Production projections for livestock products were based largely on linear trends or on government purchase plans on the domestic market. The relationship between government procurement plans, consumption plans, domestic production, and trade was also taken into consideration. Linear trends of beef and mutton production were consistent in most instances with government procurement plans. Pork and poultry meat production are more responsive to government policy changes because of the short reproduction cycles. Therefore, production projections for these meats were largely based on the planned supply to the domestic market, adjusted for net trade.

The following general assumptions about Eastern Europe underly the production projections: (1) There will be no major changes in present political alliances and trade patterns. (2) There will be no major changes in domestic economic policy, but a continuation of the moderate liberalizing trend from

the strict command economy of the past. (3) Favorable price relationships will be maintained to allow fulfillment of production plans. (4) Feed supplies will be kept at an adequate level through increased imports should domestic production fall short. (5) Weather will be normal.

II. ECONOMIC INSTITUTIONS AND POLICIES

Recent Economic Reforms

East European economies are directed by centrally determined and administered 5-year plans; the current ones are for 1971-75. However, since the mid-1960's, reforms have been introduced to reduce excessive centralized planning and management and to allow greater reliance on profits, prices, and specialization in production decisions. Yugoslavia has advanced most towards decentralization and market orientation. Though production and marketing restrictions in each country's agricultural sector have been considerably relaxed and investment in agriculture has been increased, rapid industrialization is still the dominant official goal. Two features of the economic reforms are noteworthy:

First, before their implementation, economic systems of all East European countries except Yugoslavia were patterned after the Soviet model and therefore were much alike. To some extent, the reforms broke this uniformity as each country adopted measures better suited to its national characteristics, natural endowment, and level of development.

Second, in the 1950's and early 1960's, the economies were geared heavily towards fulfillment of quantitative plan targets. In economic literature, that period has been called an extensive period of development. During that time, the agricultural sector was seriously disadvantaged in terms of investment allocation, pricing, and incomes. Lower producer prices 4/ fixed in advance and inadequate financing led to large-scale inefficiency and neglect and had a negative effect on other economic sectors. The stagnation of East European economies eventually resulted in a general reassessment of priorities and the implementation of reforms, initiating an intensive period of development, with emphasis on yields and quality backed by improved farm prices and increased investment in the farm sector (97).

During 1961-65 to 1966-70, the rate of increase in agricultural investment ranged from 1.2 percent annually in Czechoslovakia to 11.2 percent in Romania. The average was 9 percent for the region--about the same rate as the increase in total investment. Agriculture's share of total investment increased in East Germany, Poland, Hungary, and Romania (table 4).

^{4/} Producer prices in the Socialist countries are as a rule based on the "average cost of production" of the particular sector branch. They exclude rent and capital charges. In agriculture, until they were abolished, compulsory delivery prices were lower than the cost of production (97).

Table ϕ --Amount and rate of growth of total investment and agricultural investment, Eastern Europe, averages 1961-65 and 1966-70 and planned 1971-75 1/

Investment and period	Czechoslovakia East Germany (Crowns) $\frac{2}{2}$	East Germany (Marks)	Poland $(2lotys)$	Bulgaria (Leva) $\frac{4}{4}$	Hungary (Forints) $\frac{4}{4}$	Romania (Leis) <u>5</u> /	Yugoslavia (Dinars) $\frac{1}{4}/\frac{6}{6}$
			Million	ion			
Total investments: 1961-65	39,641 52,271	17,868 27,123	123,840 183,803	1,507 <u>7</u> /3,086	47,349 72,431	37,381 62,896	15,139
Agricultural investments: 1961-65	5,518	8/2,366 8/3,877	16,821 28,361	354 492	6,282	6,558	1,394
: Rate of growth:			Percent	ent			
Total investment: 1961-65 to 1966-70: 1966-70 to 1971-75:	5.7	5.2	8.2	15.4	8.0	11.0	12.1
Agricultural investment:: 1961-65 to 1966-70: 1966-70 to 1971-75:	1.2	10.4	11.0	3.6	10.5	11.2	7.9
Share of agricultural investment in total: 1961-65	13.9 12.4	13.2 14.3	13.6	23.5 15.9	13.3 14.3	15.3	9.2

countries make these series not completely comparable or reliable. Hence, they can be used only to indicate broad trends. 2/1967 prices. 3/1961 prices. 4/ Current prices. 5/1963 prices. 6/ Socialized sector only. 7/ Private and cooperative construction, not counted in previous 5 years, were added. \perp Definitional changes of investments within the time periods and current prices used in some 8/ Including forestry.

Sources: (6, 7, 9, 12, 15, 19, 36, 52, 64, 71, 72, 74, 76, 81, 86, 87).

As a result of increased agricultural investment, the level of inputs in agriculture improved considerably during the 1960's. In 1960, each tractor served 124 hectares of arable land; in 1970, it served 58 hectares. The 1970 figure compares to 42 hectares in the United States at about the same date. Use of mineral fertilizers increased from 56 to 145 kilograms per hectare of arable land over 1960-70. The 145 kilograms compares to 124 in the United States where land cultivation is extensive, but is much below the 210 kilograms used in France or the 344 kilograms used in West Germany--areas with intensive cultivation as in Eastern Europe. Irrigation and land improvement have also received a substantial share of agricultural investments, particularly in the southern countries of the region, where 1970's irrigated area was almost 3 million hectares, or about 6 percent of the arable land (16, 18, 25, 83).

Most agricultural commodities in Eastern Europe are sold at fixed government prices by contract between farm and government purchasing agencies. Recent reforms have generally eliminated compulsory deliveries and government purchasing monopolies and allowed the expansion of outlets to include direct sales to food processors, trade organizations, and other outlets. A lesser, but substantial, share of farm products move at free market prices on local markets, although free sales of certain commodities, especially grain and meat, are still forbidden in some countries. Major price increases were placed on most commodities, including livestock, in the mid-1960's; in 1969, several governments again increased livestock prices.

Several specific and interrelated situations—still operative—prompted East European governments to introduce more liberal economic policies. First, compared with yields in more developed countries of the West, yields in the region are low. Further, the possibilities of bringing additional land under cultivation are almost nil. Cultivated area will more likely decrease, owing to increasing land requirements for industrial purposes, urban development, transport, water and power projects, and the like. Second, the relative increase of urban population and rising personal incomes have put pressure on the authorities for better quality diets and for a better supply of other goods. Demand for meat has particularly increased in Eastern Europe. It has also risen in the Soviet Union and Western Europe, providing potential markets for exportable surpluses in exchange for raw materials and badly needed hard currency.

Land Tenure and Farm Structure

The influence of the Soviet Union on Eastern Europe after the Second World War resulted in introduction of economic institutions similar to those in the Soviet Union. In agriculture, this meant nationalization of all land, farm machinery, and livestock, and the creation of collective farms, state farms, and machine-tractor stations, with private property limited to living quarters and a small garden plot. By 1962, socialization was largely completed, except in Poland and Yugoslavia, where peasant opposition and a disastrous fall in productivity arrested the process. In these two countries, about 85 percent of the farmland remains in private hands. In the other five countries, the share of farmland in collectives and state farms ranges from 84 percent in Hungary to 89 percent in Bulgaria (table 5).

Table 5--Land tenure and average farm size in Eastern Europe, 1967

			Land tenure	ıre		Average	age farm size	Ψ
Country	Farm-land $\frac{1}{2}$: Owner- : operated enterprises	Personal plots	:Collective : :cooperative : enterprises :	State enterprises	: Private :(: Collective:	State
	1,000 hectares	l	Pe	Percent			Hectares	
Czechoslovakia East Germany	7,059	0.9	1.4	55.8	29.6	31.9	669 409	4,294
Bulgaria	5,675		10.3	7.69	19.5	° NA	5,225	5,580
Hungary	9,303	8.7	10.3	68.3 54.4	15.7	2.3 NA	1,850	4,827
Yugoslavia	10,285	84.0	NA	7.0	0.6	4.2	520	4,082

1/ Country census data or estimates.

Sources: (97, p. 204) for land tenure system; (18) for average farm size.

By European standards, state farms are usually very large--close to 5,000 hectares--except in Poland and East Germany, where they are smaller. They are highly mechanized and maintain their own farm machinery, machinery repair workshops, and feed mills for livestock. State farm workers receive regular wages.

Collective farms are much smaller, except in Bulgaria, where their size is similar to the state farms. In Hungary and Romania, they average just under 2,000 hectares, and in Czechoslovakia, East Germany, and Yugoslavia, about 500 hectares. These farms are not as highly mechanized as state farms. In general, they were served until recently by centrally located machine-tractor stations and workshops. The stations have been transformed into machinery repair workshops and the collectives now own their own machinery. Although collectives are of many kinds, in most countries collective farmers retain titles to land 5/ equivalent in area to the amount of land contributed to the farm, and receive a portion of net farm income or rent for their land. Farmers' incomes are largely dependent on net farm earnings, with 75 to 80 percent of income distributed being based on labor days worked. Several countries have introduced minimum guaranteed monthly farm wages.

In Poland and Yugoslavia, the two countries with farmland predominantly in private hands, the average size of private farms is under 5 hectares. Polish law forbids their growth beyond 15 to 20 hectares, depending on the region. These farms are often very fragmented, and although further fragmentation to less than 8 hectares is forbidden, there are still too many uneconomically small farms. Yugoslavia, where farm size is limited by law to 10 hectares, has a similar problem. In both countries, farming methods on the small, private holdings are traditional, with farmers using animal power and few additional inputs. Besides having to operate within the size limitations, the farmers have been discriminated against in pricing and credit policies which favor the socialized sector (78).

Income

Incomes in Eastern Europe vary by country as much as in Western Europe. They are generally below West European levels, but income growth in the poorer countries of the region is faster than in Western Europe. In terms of per capita GDP, incomes in Czechoslovakia and East Germany are about two-thirds those of France and West Germany; in Hungary, Poland, Bulgaria, and Romania, they are less than one-half; and in Yugoslavia only one-fifth (table 6).

The International Monetary Fund estimates that per capita GDP in Czecho-slovakia and East Germany grew during the 1960's at rates comparable to those in advanced West European countries—3.9 and 4.1 percent per year, respectively against 3.7 percent in West Germany and 4.8 percent in France. Growth rates

^{5/} This prerogative, however, does not seem to have any practical significance.

Table 6--Per capita gross domestic product and intake of calories and protein in Eastern Europe and selected West European countries

Country	CDP	: Calories : per day <u>2</u> /:	Pro Total	oteins per d Of anima	
	Dollars	Number	Gra	ams	Percent
Czechoslovakia East Germany Poland	: 1,719	3,031 3,040 3,145	83.3 76.4 93.2	38.7 40.7 42.6	46 53 46
Bulgaria Hungary Romania Yugoslavia	: 1,208 : 925	3,068 3,107 3,012 3,154	90.7 86.2 87.0 89.0	26.1 32.3 26.2 21.1	29 37 30 24
France Italy West Germany	: 1,690	3,108 2,818 2,927	98.2 84.0 80.1	56.4 34.1 50.8	57 41 63

 $[\]frac{1}{2}$ / 1970 prices. $\frac{2}{2}$ / 1964-66 average.

Sources: Per capita GDP: (21, vol. 8, pp. 20-25); calories and protein intake: (22).

were 7.5 percent in Romania, 6.7 percent in Bulgaria, 5.5 percent in Hungary, and 5.1 percent in Poland. Only Yugoslavia, among the five less developed East European countries, had a more modest rate of growth--4.6 percent (47, p. 59).

III. CONSUMPTION PATTERNS AND PROJECTIONS

Factors Affecting Consumption

Food Consumption 6/

East European diets average 3,000 to 3,150 calories per day and 76 to 93 grams of proteins, levels comparable to those in most Western countries. But diet quality differs considerably between the northern and southern countries of the region (table 6). In Czechoslovakia, East Germany, and Poland, daily consumption of proteins of animal origin averaged 41.2 grams in 1964-66, about the same as in Italy, while in Bulgaria, Hungary, Romania, and Yugoslavia, the average was only 25.4 grams.

Earlier government policies in the region were geared towards a quantitatively adequate diet, bringing calorie content to levels prevalent in economically advanced Western countries. Recent reforms and rising per capita incomes have resulted in emphasis on diet quality. As a result, there has been a shift from high carbohydrate foods in favor of high protein foods, principally livestock products.

Population size and growth, per capita disposable income, prices, individual preferences, and government policies all influence the level and composition of food consumption. This section of the report analyzes the effect of quantifiable factors on East European food consumption levels.

Population growth alone contributed, on the average, 0.7 percent annually to the increase in food consumption in the region during the 1960's. Population in the southern countries expanded by 0.9 percent annually, while that of the northern countries expanded by 0.6 percent. Yugoslavia experienced the fastest population growth, while East Germany suffered a loss of population. Similar rates of growth are projected for the 1971-80 period, resulting in a projection of 0.8 percent per year for the region. Thus, total East European population is expected to increase from 123.5 million in 1970 to 133.2 million in 1980 (table 1). This rise will cause a proportionate increase in food consumption.

Income elasticities for food in Eastern Europe indicate that changes in disposable personal income, or "purchasing power", will also exert considerable influence on food consumption levels in the future. National income 7/ data are used here to measure the "purchasing power" of a country. National incomes

^{6/} Part of this section was contributed by Linda Bernstein Schneider.
7/ See the definition of national income in Eastern Europe in table 7,

footnote 1.

in Eastern Europe are projected to grow during 1971-75 at annual rates ranging from 4.9 percent in East Germany to 8.4 percent in Bulgaria (table 7). Growth rates similar to those of 1971-75, although lower for Czechoslovakia and Bulgaria, are projected for 1976-80. More important than total national incomes are per capita national incomes. These are projected to increase considerably in every East European country during 1971-80.

With a projected increase of 10 million people above the 1970 level by 1980, a yearly increase in per capita national income of at least 4 percent in each country, aggregate food consumption will increase substantially. Rising incomes will have a more important effect, however, on changes in the composition of typical diets, by accelerating the shift in consumption from grains to livestock products.

This conclusion is supported by income elasticities of demand adapted here for Eastern Europe and selected West European countries from a study by the Food and Agriculture Organization (FAO) of the United Nations (table 8). In general, higher income elasticities for meat are found in countries having lower per capita income levels. An exception is Bulgaria; for this country, very rapid income increases in the past were projected into the future, making it necessary to scale down FAO income elasticities to allow for reasonable future increases in consumption of food items. The FAO elasticities, in combination with projected national income changes, were used in the projection of East European food consumption levels in 1975 and 1980.

As a result of the region's limited availability of consumer durables, and its free education and medical services, cheap transportation, and housing rents fixed well below maintenance and amortization costs (although supply has increased less than in Western Europe) (4), East Europeans appear to allot a disproportionately large percentage of their total expenditures to food, although food prices are also subsidized. Because of this distortion of price relationships and expected continuation of consumer price subsidies, food prices had to be assumed constant in the consumption projections model.

Artificially set exchange rates and definitional differences make it difficult to compare prices between Eastern and Western Europe, or even among East European countries. Some comparisons can be made, however, by looking at the time required for an average worker to earn enough money to buy selected commodities. These "labor requirements" reflect relative purchasing power from country to country. Using wage and price data of the International Labor Organization (44, 45, 46), we have drawn up labor requirements for seven foods (table 9). However, these represent only limited generalizations. For example, the differing labor requirements do not reflect any quality differences among commodities, and "beef" refers to a specific cut comparable country by country not to a weighted value for all beef. In any case, beef, milk, and eggs had generally higher labor requirements, or were "more expensive", in Eastern Europe than in France, Italy, and West Germany -- the three West European countries used for comparisons. Pork was generally more expensive in the southern part of Eastern Europe than in the West European countries. In every country considered except the two Germanies, pork was more expensive than beef. In Poland, the relatively high price of pork might be explained as representing an official attempt to divert domestic consumption to beef, thus leaving more pork for hard-currency-earning exports.

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Table 7--National income produced in Eastern Europe, 1970 and projections to 1975 and 1980 $\underline{1}/$

Annual rates of growth 70 : 1971-75 : 1976-80	5.1 4.6 5.4 5.4	6.4 6.4 6.4	6.5 6.5	8.4 7.4 7.7 6.7	5.5 5.5 5.1	6.6 6.6 5.5 5.5	5.1 5.1 4.0
Annua 1961-70	8° 4	† † † † † † † † † † † † † † † † † † †	6.1	8.1	5.0	7.1	6.5
1980	450.4 29,827	181.6	1,385.9	19,487 2,141	471.7 44,084	7474	235.7 10,324
1975	359.7 24,237	143.0	1,011.5	13,642	360.1 34,295	NN	183.8 8,486
1970	281.0 19,424	112.6	738.3	1,040 1,040	274.9	NA NA	143.3
National currency units	Billion crowns Crowns	Billion marks Marks	Billion zlotys Zlotys	Million leva Leva	Billion forints Forints	Billion leis Leis	Billion dinars Dinars
Country and type of income :	Czechoslovakia: Total Per capita	East Germany: 2/ Total Per capita	Poland: Total	Bulgaria: 3/ Total Per capita	Hungary: Total Per capita	Romania: Total Per capita	Yugoslavia: Total Per capita

created volume in material production of all economic sectors, plus the balance in the foreign trade price equalization. It excludes services of a nonmaterial nature as well as raw materials and means of production used in the production process ($\frac{1}{4}$, p. $\frac{1}{4}$; $\frac{54}{4}$). $\frac{2}{4}$ In 1967 prices. $\frac{3}{4}$ In 1969 prices. $\frac{1}{4}$ 1969. $\frac{5}{4}$ Not projected. 1/1 In 1970 prices except when noted otherwise. The national income produced is a monetary expression of newly

Sources: (6,7,19,21,35,37,50,73,80,91)

Table 8--Income elasticities of demand for selected food items in Eastern Europe and selected West European countries

• •	() () ()			Animal products	ducts		••		Cereals	
Area	(calories):	Beef	Pork	Poultry	: Mutton : & lamb	Milk	Eggs	Wheat:	Coarse : grains	Rice
••										
Czechoslovakia:	†0°+	+.50	+° 7†0	+.80	+.00	+.20	O†.+	20	30	+.10
East Germany:	+.07	+. 40	+.20	+1.00	00.+	+.30	+.30	1/+.10	40	+.10
Poland	1.01	+.70	+.30	+1.00	+ 00	+.10	+.40	10	32	+.20
Bulgaria	+00	1/+.35	1/+.35	1/+.76	1/+.46	1/+.27 1/+.37	1/+.37	10	36	+.20
Hungary	+.05	+.70	1/+.30		+.60	+.30	+.50	10	- .30	+.20
Romania	+.02	+.80	1/+,35		1/+.50	+.30	+.70	i	30	+.20
Yugoslavia	70	+ 80	+ .60		+.50	+ . 40	+.80	10	48	+.20
France	+.07	04.+	+. 40	+.50	+.60	+.10	+.20	-, 40	10	+.20
Italy	+.13	+.80	+.50	+.80	+.50	+,30	+.50	20	38	00.+
West Germany	+.07	+.50	+, 40	+.60	+.20	+ 00	+.30	40	↑0°-	+.30

1/ ERS estimate.

Source: (21) except for entries footnoted.

Table 9-Labor requirements for retail purchase of selected foods in Eastern Europe 1/ and selected West European countries, 1970

Country :	Bread (kg.)	Flour (kg.)	Beef (kg.)	Pork (kg.)	Mutton (kg.)	Milk (liter)	Eggs (1 egg)
:			Hours	and m	inutes		
Czechoslovakia: East Germany: Poland	0:18	0:18	1:54	2:36	1:42	0:14	0:07
	0:12	0:18	2:18	1:54	NA	0:10	0:04
	0:18	0:24	1:48	3:24	1:38	0:16	0:08
Bulgaria: Hungary: Yugoslavia:	0:12	0:42	3:00	4:54	2:34	0:26	0:08
	0:12	0:24	1:36	3:12	2:00	0:17	0:08
	0:23	0:27	2:36	3:49	NA	0:15	0:08
France: Italy West Germany:	0:30	0:24	1:24	2:42	4:30	0:13	0:06
	0:24	0:18	NA	3:18	3:06	0:13	0:06
	0:18	0:12	1:06	0:42	1:18	0:08	0:02

^{1/} Romania excluded because wage and price data are not available.

Source: Calculated from table 11.

In terms of the average worker's hourly wage, bread in Eastern Europe cost almost as much as in Western Europe; the labor requirement ranged from 23 minutes of work per kilogram in Yugoslavia, to 12 minutes in East Germany. In West Germany it was 18 minutes and in France 30 minutes.

Up to half of consumer expenditures go for food, beverages, and tobacco in Poland, Bulgaria, Humgary, and Yugoslavia, compared with 30 to 44 percent in the selected West European countries (table 10). As mentioned earlier, heavily subsidized housing and social services in Eastern Europe, coupled with higher prices for many livestock products, help to explain this difference in consumer food expenditures. While expenditures for housing, utilities, furnishings, and household durables were 10 to 16 percent of total Eastern Europe in 1969, they ranged from 20 to 31 percent in Western Europe. This disparity reflects the subsidized rents in the Socialist countries and the unavailability of certain consumer durables there. Reflecting subsidized telephone services and the lack of automobiles, expenditures for transportation and communication in Eastern Europe were a low 1.5 to 5.3 percent of total expenditures (except in Yugoslavia), compared with about 10 percent in France, Italy, and West Germany.

Despite the apparently higher percentage of income allocated to food purchases, there is substantial evidence of government subsidization of many food items in Eastern Europe. In 1972, average East German food prices were 23 percent lower than they would have been without government subsidy (65). The Hungarian consumer could buy for about 45 forints per kilogram, choice pork cuts which cost 60 forints to produce (56). Milk was sold below procurement cost in Poland, although the exact level of subsidy could not be estimated (98). The level of these subsidies, however, is not as great as subsidies granted to transportation, housing, medical services, education, and other services, so that the share of total income allocated to food is higher in East Europe than in the selected West European countries.

In addition to being subsidized, prices are extremely rigid for most East European food items. Only in Yugoslavia did the price of bread and flour change between 1960 and 1970. Some changes occurred in the price of animal products, but the effects of government policy were apparent in the price's extreme stability or on occasion sudden and substantial change. The region's stable prices do not necessarily indicate supply increases corresponding to rising levels of demand, nor do they reflect the quality of animal products. Since prices are rigidly controlled, an increasing demand with no corresponding increase in supply may result not in increased prices, but only unfulfilled demand. Despite this, in terms of power to purchase various food items, East Europeans are now better off than they were a decade ago (table 11).

The continuation of subsidized housing and social services, combined with rising incomes, should assure continued high demand for meat and livestock products in Eastern Europe, despite relatively higher prices. Increased efficiency of meat production may reduce production costs, although a higher export demand for meat may tend to limit a corresponding reduction in meat prices. On the other hand, greater availability and lower prices for durable goods will probably stimulate more spending for them.

Table 10--Distribution of consumer expenditures, by type, in Eastern Europe and selected West European countries, 1969

Expenditure	Czecho- East slovakia Germany		Poland	: :Bulgaria:Hungary	Hungary :	Yugo- slavia	France	Italy	West
	•• ••				Percent	ıəl			
Food	28.2	27.6	46.5	42.0	35.2	0.04	23.7	37.7	30.6
Beverages & tobacco	1/2.9	9.6	3.6	5.3	13.9	10.8	6.3	6.7	5.5
Total	31.1	37.2	50.1	47.3	1,64	50.8	30.0	44.4	36.1
Clothing & shoes	10.5	12.5	16.3	12.2	11.8	13.9	10.0	9. W	10.6
Housing, utilities, & household durables	16.5	10.0	14.3	13.7	14.6	15.3	20.7	19.6	30.7
Transportation & communication	MA	1.5	2.6	2.6	5.3	8.0	10.3	10.1	6.
Hygiene	NA	NA	3.7	1.2	6.1	8	11.8	NA	3.7
Entertainment & education:	NA	2.2	6.5	5.1	10.0	4.2	7.2	2.7	9.9
Other 2/	41.9	36.6	6.5	17.9	3.	9.0	3/10.0	13.9	N

For other countries, Data for France, West Germany, Italy, and East Germany are in terms of households. they are in terms of per capita expenditures,

ef- $\underline{1}/$ Beverages only. $\underline{2}/$ Includes expenditures for other industrial goods, savings, taxes, personal fects, and other items not elsewhere specified. $\underline{3}/$ Expenditures for hotels, restaurants, and cafes.

Sources: (6, 19, 21, 37, 42, 45, 52, 74, 81, 84).

Table 11--Wage rates and retail prices of selected foods in Eastern Europe $\underline{1}/$ and selected West European countries, 1960, 1965, and 1970

C		: Av. :			C	ommodit	y		
Country and year	.Currency	:hourly: : wage : : rate :	Bread	: Flour . (kg.)			:Mutton: . (kg.).		
	: :	: :			Local c	urrency	per uni	t	
Czechoslovakia: 1960 1965 1970	: :	: : 7.0 : 7.7 : 10.6	3.6 3.6 3.6	3.5 3.5 3.5	NA 20.0 20.0	NA 26.0 28.0	NA 18.0 18.0	2.6 1.9 2.5	0.7 1.3 1.3
East Germany: 1960 1965 1970	:	2.9 3.7 4.3	1.0 1.0 1.0	1.3 1.3 1.3	9.8 9.8 9.8	8.0 8.0 8.0	NA NA NA	0.7 0.7 0.7	0.4 0.3 0.3
Poland: 1960 1965 1970	:	: 10.1 : 11.5 : 16.6	5.0 5.0 5.0	6.7 6.7 6.7	26.0 36.0 30.0	36.0 36.0 56.0	24.0 40.0 27.0	3.1 3.3 4.4	2.1 2.4 2.3
Bulgaria: 1960 1965 1970	:	0.4	0.2	0.5 0.5 0.5	NA 1.4 2.1	NA 2.2 3.4	0.8	NA 0.3 0.3	0.1 0.1 0.1
Hungary: 1960 1965 1970	:	8.7 9.6	3.0 3.0 3.0	4.6 4.6 4.6	16.6 16.6 20.0	30.0 30.0 39.0	16.0 16.0 25.0	3.6 3.6 3.6	1.8 1.8 1.7
Yugoslavia: 1960 1965 1970	:	0.9 2.5 6.0	0.5 1.3 2.3	0.7 2.0 2.7	NA NA 15.6	NA 11.8 22.9	3.1 8.5 NA	0.5 1.4 1.5	0.3 0.6 0.8
France: 1960 1965 1970	:	2.1 3.0 4.7	0.6	1.1 1.3 1.8	4.0 5.4 6.6	NA NA 12.5	12.2 18.6 21.2	0.6 0.7 1.0	0.3 0.3 0.3
Italy: 1960 1965 1970	•	232 386 606	124 150 235	131 174 175	NA NA NA	1,167 1,590 2,026	1,058 1,537 1,902	90 110 135	34 43 40
West Germany: 1960 1965 1970	:	2.6 4.1 6.0	1.1 1.4 1.7	0.8	5.2 6.7 6.3	4.2 4.8 4.5	4.8 6.0 8.0	0.6 NA 0.8	0.2 0.3 0.2

^{1/} Romania excluded because no price data were available; 1960 wage data were not available; average hourly wages in 1965 and 1970 were 6.5 and 7.7 leis, respectively.

Feed Consumption

The type of feed consumed in any region depends on ecological conditions, while the quantity consumed is a function of the level of technology of the livestock sector. Because of substitution, within fairly broad limits, of concentrates for roughages, production of roughages (such as corn silage, beets, and potatoes in some countries) plus the area of pasture determine the utilization of grains and of other concentrated feeds. The type of livestock, livestock production and mortality rates, and breeding efficiency are all important factors in determining feed requirements.

To analyze East European feed requirements and project them to 1980, we developed concentrated and total feed requirements for seven types of livestocl products for the 1966-70 base period. 8/ Feed requirements were based on official data where available, but were adjusted where particular knowledge of livestock feeding practices justified it. The estimated feeding rates were then verified by calculating total and concentrated feed consumption and by comparing this estimate with independent grain, protein meal, and roughage consumption data. However, detailed feeding rates were projected only for grains, oilseed meal, and fish and meat meal (tables 12 and 13).

It is generally accepted that Czechoslovakia and East Germany are more efficient than other East European countries in livestock feeding, in terms of feed requirement per unit of output. However, when roughages are added to the concentrates, computed rates in the northern countries seem higher than in the southern ones, except in Yugoslavia, where baby beef produced for export are fed an unusually high concentrate ration (57). The reason for this discrepancy is that less permanent pasture is available in the north. But since the productive capacity of pasture could not be measured for lack of data, pasture has been excluded from the computation of feeding rates. The area of pasture available per grazing animal unit 9/ in the south is more than 3.5 times greater than that in the north, although pastures in the north are generally of better quality and are used more efficiently (table 14). This explains why the percentage of concentrates to all feeds, excluding pasture, is higher in the south than in the north (table 15).

Consumption of Livestock Products

Trends

In the 1960's, demand for livestock products advanced in Eastern Europe. Growth in per capita demand for meat betwen 1961-65 and 1966-70 ranged from 1.3 percent per year in Hungary to 4.0 percent in Bulgaria, averaging 2.8 percent for the region. Only Hungary had a significantly lower growth rate over this period than over the 1956-60 to 1961-65 period.

^{8/} Six major feeds were included in the calculations: grain, protein meals, corn silage and green feed, hay, fodder beets, and potatoes. The livestock products are beef and veal, pork, mutton and lamb, poultry meat, milk, eggs, and horses.

^{9/} Grazing animal units here are cattle, sheep, and horses.

Table 12--Estimated feed requirements $\frac{1}{2}$ per kilogram of animal product $\frac{2}{2}$ and per horse per year, Eastern Europe, average 1966-70 and projections to 1975 and 1980 $\frac{3}{2}$

	-		Grains		01	il meal		Fish a	and meat me	meal
country and product :	Unit	1966-70	1975	1980	1966-70	1975	1980	1966-70	1975	1980
: Czechoslovakia:										
Meat	Kgs.	2.720	3.024	3.087	0.153	0.187	0.219	0.038	740.0	0.057
Eggs	. op :	3.850	3.717	3.625	544.	. 522 928	.576	119	.171	197
Horses	M.H.	: .951	.935	.935	.071	.085	.085	0	0	0
East Germany:	Kgs.	2, 225	2.291	0	. 325	414.	.473	990°	401.	.123
Milk	do.	760.	0110	122	010.	410.	.018	.002	.003	.003
Horses	M.T.	3:03	120.5 1814	VI () I	.079	.105	.127	0)0.0	. LKK	• T44
Poland:		•• ••								
Meat	Kgs.	1.784	2.327	2.386	.101	.162	.197	.028	.045	450°
I ggs	do.	4.261	4.11.4	4.012	296	403	505	.078	.130	441.
Horses	M.T.	961. :	. 790	. 790	540.	.065	.065	0	0	0
Bulgaria:) 3 2	α α α	909 0	784 0	C	C	770	С Г	200	C
MILK	hgs.	500.0	.175	.187		ήτο.	.016	100:	.002	.002
A	do.	. 4.675	4.578	4.532	775.	.636	.756	770.	770.	.087
norses	* T. • TAT	(35	04).	. 140	0) 0.	000.	160.)	>	>
Hungary:	K S S	0.480	0,660	\subset	154	. 208	543	[20]	780.	940.
Milk	do.	990	.081	180.	₹00.	700.	008	.001	.001	.002
E 868 H	do.	. 4.350	4,200	5	. 282 	.362	424.	.031	090.	₽ . 074
nor sees.	M·T·	50) •	(%).	7		000.	0.	-	0 + 0 -	† H O

See notes at end of table.

Continued

Table 12--Estimated feed requirements $\frac{1}{2}$ / per kilogram of animal product $\frac{2}{2}$ / and per horse per year, Eastern Europe, average 1966-70 and projections to 1975 and 1980 $\frac{3}{2}$ --Continued

יי + סווס מיני לימוס איני לימוס לי	+ tall		Grains		0	Oil meal		Fish an	and meat m	meal
comicily and particular		1966-70	1975	1980	1966-70	1975	1980	1966-70	1975	1980
Romania: Meat	Kon	707	0000	2.110	900	080	179.0	800.0	0.003	0 003
Milk	do.	.114	.123	.133	.012	.012	.013			. 0
Eggs	do. M.T.	: 4.500 : .575	4.345	4.280	.546	.562	.615	.003	.007 0	900.0
		••								
Ingostavla: Meat	Kgs	3,335	3.544	3.601	.112	.183	.213	.031	640.	090.
Milk	do.	: .150	.155	.160	900.	600.	.010	.001	.002	.003
Eggs.	do.	: 4.750	4.684	4.610	.253	.390	. 471	190.	.104	.126
Horses	M.T.	. 266	.560	.560	.028	.033	.033	0	0	0
Eastern Europe		••••								
Average:										
Meat	Kgs.	: 2.443	2.758	2.852	.157	.208	.245	.028	.043	.051
Milk	, ob	.124	.155	.165	.008	.014	.017	.001	.003	†00°
Fggs.	do.	.: 4.250	4.052	4.069	.377	.457	.540	.065	990.	.081
Horses	M.T.	: .719	.714	.715	.042	,054	.055	0	0	0
••										

All grains equaled 1.0; all oil meals $\frac{1}{2}$ / Excluding pastures, roughages, milk, and farm scraps. $\frac{2}{2}$ / In the case of meat, per kilogram live weight. $\frac{2}{3}$ / In calculating feeding rates, we used the following conversion factors: All grains equaled 1.0; all oil meals and cakes equaled 1.4; fish and meals equaled 1.6; corn silage and green feed equaled 0.15; hay equaled 0.50; fodder beets equaled 0.12; and potatoes equaled 0.25.

Sources for base year rates: (27, 57, 59, 66, 67, 68).

Table 13--Comparison of estimated East European feed consumption levels using livestock feeding rates and using aggregate grain and protein meal balances and official roughage data, average 1966-70 1/

(Cereal equivalent basis) Method of estimation Country and feed Difference Feeding rates Actual 1,000 metric tons Percent Czechoslovakia: Concentrated....: 5,423.2 5,556.3 -2 Total...: 11,468.3 11,809.6 -3 East Germany: Concentrated....: 6,400.3 6,490.5 -1 13,279.6 14,002.1 **-**5 Poland: Concentrated....: +2 11,296.1 10,695.4 Total....: 27,326.7 27,529.9 -1 Bulgaria: Concentrated....: 3,467.3 -12 3,033.2 5,045.1 Total....: 4,637.8 -8 Hungary: 5,833.6 -2 Concentrated....: 5,721.9 8,611.4 Total....: 8,194.4 +5 Romania: Concentrated....: 5,823.4 5,246.2 +11 8,880.2 Total....: 10,199.7 +15 Yugoslavia: 6,570.3 6,949.9 Concentrated....: 9,650.3 Total....: 10,604.1 +10 Total Eastern Europe: 44,268.4 44,239.2 Concentrated....: 86,127.6 85,111.6 Total....:

^{1/} Feed consumption estimated with feeding rates by multiplying rates shown in table 12 with actual livestock production during 1966-70; actual estimates were made by converting feed consumption data in tables 19, 22, and 24 to cereal equivalents. Conversion factors are given in table 12, footnote 3.

^{2/} Less than one-half of 1 percent.

Table 14--Grazing animal units per hectare of permanent pasture, Eastern Europe, average 1966-70 1/

Northern countries :	Animal units per hectare	::	Southern countries	Animal units per hectare
: Czechoslovakia	4.8	::	Bulgaria	2.0
East Germany		::	Hungary	2.0
Average northern countries:	6.3		Average southern countries:	

¹/ Grazing animal units were calculated according to the following factors: Horses equal 1.0; cattle equal 0.8; sheep equal 0.1 (88).

Table 15--Consumption of concentrated feeds as a percentage of all feeds consumed excluding pastures, Eastern Europe, 1966-70 1/

Northern countries	: Percent	:: :: Southern countries ::	: Percent
Czechoslovakia East Germany Poland	: 46	Bulgaria	: 71 : 59

^{1/} Calculated after all feeds were converted to cereal equivalents, from table 13.

While the composition of meat consumption varies among East European countries, per capita consumption in total has increased substantially in each country. During 1966-70, per capita meat consumption ranged from over 63 kilograms per year in Czechoslovakia and East Germany to 30 kilograms in Yugoslavia (table 16). Northern countries generally consumed more meat per capita than the southern ones during the 1960's.

Pork is the mainstay of East European meat consumption, accounting for a range of 37 percent of total meat consumption in Bulgaria to over 67 percent in Poland (table 17). Beef and poultry products, however, are becoming increasingly important. During 1966-70, beef accounted for 18 to 36 percent of total meat consumption, and poultry meat for 5 to 26 percent. Consumption of mutton and lamb is confined primarily to Bulgaria, Romania, and Yugoslavia.

Per capita meat consumption in Eastern Europe is slightly lower than in Western Europe. The dominant factor in meat consumption, however, is economic rather than geographic. Countries with similar per capita income approximate each other in per capita meat consumption, whether East European or West European. However, even when consumption levels are similar, there is a major difference—undetectable in official data—in the quality of meat in the two regions. East European meat is often purchased with large portions of fat, bones, and waste, and seems in general inferior to meat in advanced West European countries.

In addition to increasing their meat consumption during the 1960's, East Europeans increased their per capita egg consumption. Per capita milk consumption trends, although more erratic, also showed a slight increase.

Annual total meat consumption reached an average of 5.6 million tons for the region during 1966-70, an increase of almost 20 percent over the preceding 5-year period (table 18). Each country showed a substantial increase in total meat, milk, and egg consumption.

Projections

Using the income, income elasticities, and population data presented in the first section of this chapter, we projected consumption of livestock products to 1975 and 1980. The projected increases generally follow trends of the 1960's. Per capita meat consumption is projected to increase from the 1966-70 range of 63 to 30 kilograms per year (East Germany and Yugoslavia, respectively) to 80 to 40 kilograms per year by 1980, or, for the region as a whole, by 2.4 percent per year. By comparison, 1980 meat consumption in West Germany is projected by FAO at 82 kilograms per year. Pork will continue to be the main meat in the East European diet, although poultry consumption will increase the most rapidly.

Meat consumption in 1980 is projected at 8 million tons, an increase of more than 40 percent over the 1966-70 level. More than 50 percent of total meat consumption will be pork, and more than 30 percent will be beef and veal.

East Europeans will also consume increasing quantities of milk and eggs. While the region's population in 1980 will be 9.4 percent above the 1970 level,

Table 16--Per capita consumption of selected food items in Eastern Europe and selected West European countries, averages 1956-60, 1961-65, and 1980

Total grain	165.4 168.4 155.4 141.0	146.2 125.8 124.2 120.2	212.9 206.5 191.4 176.3 166.3	256.7 260.6 258.0 241.3 229.8	184.8 180.4 175.1 167.8	NA 246.4 241.1 228.8 218.3
Rice	6444V 68800	11000 7.000 1.000	0.0000	4 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	4 + 4 × 3 × 3 × 5 × 5 × 5 × 5 × 5 × 5 × 5 × 5	NA 3.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4
Other coarse grains $\frac{1}{h}$	7 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	8 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	10.00 8.00 7.00 6.3	40.0 34.3 28.4 23.8		NA 88.1 79.9 72.5 66.5
Rye	46.9 43.6 32.0 26.1 24.3	74.3 56.2 50.9 44.0	110.9 89.0 74.9 64.7 58.4	0.0000	34.1 20.9 16.5 13.4	NA 4.7 4.3 3.9
Wheat	110.3 116.2 114.7 106.4 101.6	65.4 63.0 66.1 69.8	89.9 107.2 106.7 102.6	204.0 216.1 222.4 210.5 202.5	147.5 155.8 154.4 149.9	NA 153.5 152.4 147.6 143.1
Eggs	9.4 10.8 5/13.6 15.0 16.3	5/10.1 10.9 12.3 14.4 15.6	7.5 8.4 9.7 11.4 12.9	7.5 6.6 7.6 8.9	8.1 9.4 11.5 14.3	MA 3.8 5.2 7.6
Milk 2/	Kilograms/year 124.5 111.3 115.8 5/1 121.6 127.1	2/100.2 94.3 101.0 109.6 118.5	6/220.2 6/230.2 6/253.2 261.0 269.1	85.2 96.2 112.5 126.1 139.1	107.1 100.7 106.6 121.7 134.4	NA 115.5 112.1 122.4 133.6
Total meat	50.1 53.0 60.8 73.2 80.4	5/50.5 56.6 63.0 71.8 78.3	40.1 41.7 48.1 55.9 64.0	25.4 38.5 38.3 50.3 58.2	40.1 47.1 50.2 61.4 69.6	23.42 24.88 37.02 27.03
Poultry	3.3 4.1 8.5 9.8	80.5.5 80.4.4.5 80.4.4.5	1.4	2.9 3.7 5.1 8.7	9.3 10.1 12.2 15.2 17.6	3.5 7.1 8.9 9.0
Pork	30.2 29.7 33.6 11.5	5/30.9 32.5 38.4 40.5 42.6	28.0 27.0 30.0 32.4	9.3 11.8 13.9 16.4	22.1 26.1 27.8 33.4	9.00 1.00 1.00 1.00 1.00 1.00
Mutton & lamb	0		0.0000	5.9 8.7 8.9 1.2.1	0.00	
Beef & veal	15.8 18.6 2/20.8 25.6 28.3	5/15.5 18.6 18.8 23.3	9.8 12.0 14.3 17.5	7.4 8.3 10.4 13.1 14.8	7.9 10.0 8.6 11.6	8.0 8.0 10.7 12.8
Country and period	Czechoslovakia: 1956-60 1961-65 1966-70	East Germany: 1956-60 1961-65 1966-70 1975	Poland: 1956-60. 1961-65. 1966-70. 1975.	Bulgaria: 1956-60. 1961-65. 1966-70.	Hungary: 1956-60. 1961-65. 1966-70. 1980.	Romania: 1956-60. 1965. 1970. 1975.

Table 16--Per capita consumption of selected food items in Eastern Europe and selected West European countries, averages 1956-60, 1961-65, and 1980--Continued

eef & Mutton & lamb & l		Beef & Mutton Pork Poultry meat $\frac{2}{1}$. Wheat Rye grains grain grain				
--	--	--	--	--	--	--

(6, 9, 13, 19, 21, 37, 52, 74, 81).Sources:

 $[\]frac{1}{2}/$ Excludes fats, offals, and minor quantities of horsemeat and game. $\frac{2}{2}/$ Converted to kilograms at 1 liter = 1.030 kg. $\frac{3}{4}/$ Converted to kilograms at 1 average egg = .055 kg. $\frac{1}{4}/$ Primarily corn for Bulgaria, Romania, and Yugoslavia; barley, oats, and buckwheat in other countries. $\frac{5}{6}/$ ERS estimate based on incomplete data. $\frac{6}{4}/$ Apparently includes milk consumed as feed. $\frac{6}{4}/$ Small quantities of rye included under wheat.

Table 17--Meats consumed in Eastern Europe as a percentage of total, average 1966-70 1/

Country	Beef and veal	:	Mutton and lamb	:	Pork	:	Poultry
			Per	cent			
Czechoslovakia East Germany Poland	31.9		1.5		54.4 60.9 62.4		9.8 7.2 6.4
Bulgaria Hungary Romania 2/ Yugoslavia	17.9 27.7		23.3 11.3 8.0		37.2 56.2 46.5 46.5		12.6 25.9 14.5 18.1

 $[\]frac{1}{2}$ Excludes fats, offals, and minor quantities of horsemeat and game. $\frac{2}{1970}$.

Source: Table 16.

Total grain		2,223 2,350 2,331 2,087 2,028	2,514 2,139 2,132 2,055	6,096 6,328 6,128 5,994 5,954	10,934 10,817 10,491 10,136 9,982	1,983 2,105 2,161 2,123 2,091	1,842 1,821 1,795 1,762 1,728
oo E⊣ <i>g</i> ù		48 774 73 76	29 33 36 36 36	7 6 6 6 7 8	136 171 183 175 175 183	22.4 40.0 40.0 40.0 40.0 40.0 40.0 40.0	32 37 47 51
Ri							NELDIN
Other coarse grains		62 46 53 53	83 84 87 75 68	266 253 238 226	511 383 388 367 345	309 276 237 209 1187	
Rye <u>2/</u>		629 608 458 386 367	1,270 954 871 752 670	3,188 2,725 2,398 2,200 2,091	5,087 4,287 3,727 3,339 3,128	74 28 28 88 88 88 88	340 210 169 141 128
Wheat		1,484 1,623 1,647 1,575 1,534	1,132 1,070 1,131 1,194 1,226	2,584 3,284 3,416 3,488 3,562	5,200 5,977 6,193 6,257 6,322	1,577 1,746 1,864 1,852 1,843	1,470 1,573 1,583 1,574 1,574
H S 공용	c tons	126 151 195 222 246	175 185 209 246	215 257 310 388 462	516 593 714 856 975	0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	80 95 119 150
Milk <u>1</u> /	,000 metri	1,668 1,558 1,663 1,800	1,735 1,603 1,718 1,874 2,026	6,298 7,044 8,102 8,874 9,634	9,702 10,206 11,483 12,548	656 777 931 1,110	1,060 1,017 1,098 1,278 1,438
Total meat		674 739 874 1,084 1,214	878 966 1,076 1,250 1,360	1,154 1,277 1,541 1,901 2,291	2,706 2,982 3,491 4,235 4,865	196 232 321 443 529	398 475 515 745
: Poultry :		45 57 80 126 143	48 69 78 115	14 68 180 143	134 188 257 421 534	22 30 43 77	92 102 1255 160
Fork :		406 414 483 567	538 556 693 728	803 828 962 1,102 1,264	1,747 1,798 2,100 2,361 2,619	72 96 117 144 167	219 263 293 351
Mutton & lamb		01 01 01 01 01 01 01 01 01	8 8 8 8 8	26 21 21 24 25	52 53 53 50 50 50 50 50 50 50 50 50 50 50 50 50	45 70 75 107 127	8 9 9 8 11 11
Beef & veal		213 259 299 379 427	269 318 321 421 467	283 366 459 759	765 943 1,079 1,395 1,653	57 67 115 135	79 101 88 122 151
Country and period		echoslovakia: 1956-60. 1961-65 1966-70. 1975.	1956-60. 1956-60. 1961-65. 1966-70. 1975.	land: 1956-60 1961-65 1966-70 1975.	1956-60	lgaria: 1956-60 1961-65 1966-70 1975.	ngary: 1956-60 1961-65 1966-70 1975

See notes at end of table.

Table 18--Consumption of selected food items in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980--Continued

	Total grain		(4,750) 4,738 4,892 4,896 4,996	1,343 1,802 1,822 1,850 1,929	(12,919) 13,466 13,670 13,632 13,682	(23,853) 24,283 24,161 23,768 23,664
	Rice		NA 59 83 94 109	17 17 18 17 17 17 17	NA 177 195 219 246	NA 347 378 394 432
	Other coarse grains		NA 1,675 1,621 1,552	1,167 826 698 675 634	NA 2,777 2,556 2,436 2,323	.NA 3,159 2,943 2,802 2,669
	Rye 2/		NA 89 95 92 88	11111	NA 349 292 258 238	NA 4,636 4,019 3,597 3,366
	Wheat		NA 2,916 3,093 3,159 3,234	3/3,137 3/3,928 3/4,088 4,134 4,250	NA 10,163 10,628 10,719	NA 16,140 16,821 16,976 17,198
3	පි ව ස ස ස	c tons	NA 71 106 135	67 72 109 156	NA 292 397 520 637	NA 885 1,111 1,375 1,612
	Milk <u>1</u> /	,000 metric	NA 2,196 2,276 2,619 3,020	2,310 2,226 2,340 2,745 3,137	NA 6,216 6,645 7,752 8,861	NA 16,422 18,128 20,300 22,440
	Total meat	ri]	422 457 569 794 1,021	416 465 600 751 898	1,432 1,629 2,004 2,632 3,193	4,138 4,611 5,496 6,867 8,058
	Poultry		55 68 100 150 201	58 68 108 1145	227 268 376 532 665	361 456. 633 953 1,199
0	Pork		163 177 255 344 443	191 232 281 332 394	645 768 946 1,171 1,395	2,392 2,566 3,046 3,532 4,014
	Mutton & lamb		57 56 72 88	20 C T T T T T T T T T T T T T T T T T T	160 181 185 248 289	219 234 240 306 348
	Beef & veal		147 151 158 228 289	117 124 166 217 269	1,400 1,409 1,40 1,40 1,40 1,40 1,40 1,40 1,40 1,40	1,165 1,386 1,578 2,077 2,497
	Country and period	و م	1956-60 1965. 1976. 1980.	Yugoslavia: 1956-60 1961-65 1966-70 1975	Total southern countries: 1956-60 1961-65 1966-70 1975	Total Eastern Europe: 1956-60 1961-65 1966-70 1975

() = ERS estimate. 1/ Milk and milk products excluding butter (whole milk equivalents). 1/ Milk and milk products excluding butter (whole milk equivalents). 1/ Calculated under the assumption that total rye production less seed and waste was used for human consumption, with residual bread grain consumption being wheat. 1/ Includes limited quantities of rye.

(6, 9, 13, 19, 21, 37, 52, 74, 81).Sources:

milk consumption is projected to increase about 25 percent above the 1966-70 average to more than 22 million tons. Egg consumption is projected to increase more than 45 percent to 1.6 million tons.

By 1980, consumption of livestock products in Czechoslovakia and East Germany will be close to the level West Germany and France are expected to achieve by that date. Hungary and Poland will reach the level that was prevalent in Western Europe around 1970, but the other three East European countries, despite a high consumption growth rate, will still lag behind.

Consumption of Grains

Trends

Total East European supply of grains during 1966-70 averaged 74.9 million tons annually, 24 percent more than in 1956-60. 10/ The rate of growth in utilization also accelerated during the 1960's. East Germany was the only country to register any decline in grain utilization, and the decline occurred in only the first half of the 1960's. It was due to a substantial reduction in area planted to grain, with no accompanying increase in yield, and insufficient imports. However, production and utilization increased considerably during 1966-70.

Annual use of grain for food averaged 24.2 million tons during 1966-70 (table 19). During 1956-65, decreases in per capita grain consumption were offset by an increasing population, so that total food grain consumption was relatively stable. In the late 1960's, however, it began to decrease slightly because of lower population growth rates and a continuing drop in per capita use. Wheat and rye are the primary food grains consumed throughout Eastern Europe, although sizable amounts of corn are consumed in Bulgaria, Romania, and Yugoslavia (tables 16 and 20).

Feeding of grain to livestock has become by far the major use of grain, increasing from less than 46 percent of total consumption during 1956-60 to over 54 percent during 1966-70. Viewed another way, practically all of the 24-percent increase in consumption of grain between the two periods can be attributed to increased feed use. While total grain consumption increased at an annual rate of 2.3 percent, feed use increased by 4.1 percent annually. The growth in feed use was slow in the early 1960's but accelerated in the latter half of the decade. Every East European country has exhibited a strong tendency towards greater feed grain use; growth rates between 1961-65 and 1966-70 ranged from 3.3 percent in Hungary to 7.6 percent in Romania.

Historically, grain used for seed and industrial purposes and grain waste constituted less than 15 percent of total grain utilization in Eastern Europe.

^{10/} See Methodological Notes in the appendix for details on data and calculations.

See notes at end of table.

Table 19--Utilization of grain for feed, food, industrial purposes, seed, and waste in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980 $\underline{1}/$

~							•	ı		
Use and period	Czechoslo- vakia <u>2</u> /	East Germany	Poland $\frac{2}{2}$	Northern countries	Bulgaria :	Hungary	Romania	: Yugoslavia	Southern countries	Total Eastern Europe
•• •• •					1,000 metric tons	cic tons				
Feed: : : : : : : : : : : : : : : : : : :	3,580.6 3,834.0 5,055.8	4,523.8 4,617.6 5,667.2	6,906.8 8,691.0 9,929.4	15,011.2 17,142.6 20,701.4	1,760.8 2,211.2 3,162.1	3,986.9 4,553.2 5,380.7	2,685.6 3,631.3 4,733.8	4,292.2 4,682.6 6,566.6	12,725.5 15,466.3 19,843.2	27,636.7 32,608.9 40,545.6
1975	6,547.0 7,493.0	6,652.0 7,515.0	14,282.0 15,902.0	27,481.0 30,910.0	4,108.0 4,815.0	7,152.4 8,053.0	6,673.0 8,550.0	8,372.1 9,492.0	26,305.5 30,945.0	53,786.5 61,855.0
Food: 1956-60 1961-65	2,323.8 2,350.4 2,230.6	2,514.4 2,139.0 2,132.6	6,096.2 6,328.0 6,127.6	10,934.4	1,983.0 2,105.0	1,842.1 1,820.6	(4,750.0) 4,738.1 4,891.8	4,343.4 4,801.8 4.822.0	(12,918.5) 13,465.5	(23,852.9) 24,282.9 24,160.9
1975	2,086.8	2,055.4	5,994.2	10,136.4	2,123.4	1,761.9	4,896.3	4,850.0	13,631.6	23,768.0
Industrial: : 1956-60:	422.0	281.0	205.0	908.0	54.0	78.6	(200.0)	156.6	(489.2)	(1,397.2)
1966-70	676.2 800.3 927.4	369.0 417.0 461.0	312.0 372.6 426.2	1,357.2 1,589.9 1,814.6	67.5 72.9 79.6	107.0 119.9 134.1	256.2 256.2 279.6 307.6	226.8 226.8 268.7 303.8	571.7 657.0 741.1 825.1	2,014.2 2,331.0 2,639.7
Seed: $\frac{3}{1956-60}$	402.2	389.0	1.722.0	2.513.2	7 607	457.4	869.6	608.8	2,345.2	4.858.4
1961–65	387.6	367.2	1,611.0	2,365.8	373.8	411.8		639.8	2,254.6	4,620.4
1975	420.8	373.1	1,478.3	2,272.2 2,198.3	330.0 321.2	460.0	750.0	600.0	2,140.0 2,051.4	4,412.2
Waste: 4/ :: 1956-60: 1961-65:	266.4	301.8	700.0	1,268.2	217.8	320.0 340.4	457.8 543.6	430.0	1,425.6	2,793.8
1966-70: 1975: 1980	348.6 428.9 484.3	345.6 411.5 455.6	850.0 1,081.0 1,235.8	1,544.2 1,921.4 2,175.7	307.4 380.3 418.0	398.6 468.9 546.0	666.8 755.6 855.4	655.2 769.0 864.4	2,028.0 2,373.8 2,683.8	3,572.2 4,295.2 4,859.5

Table 19--utilization of grain for feed, food, industrial purposes, seed, and waste in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980 1/--Continued

Use and period	Czechoslo- vakia <u>2</u> /	East Germany	Poland \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Northern	Bulgaria : Hungary	Hungary	: Romania	: Yugoslavia	Southern :	Total Eastern Europe
					1,000 metric tons	ic tons				
Total:										
1956-60:	6,995.0	8,010.0	15,630.0	30,635.0	4,425.0	6,685.0	8,963.0	9,831.0	29,904.0	60,539.0
1961-65:		7,753.0	17,663.0	32,803.0	4,983.0	7,215.0	0,956,0	10,853.0	33,395.0	66,198.0
1966-70:		8,893.0	18,836.0	36,459.0	6,036.0	8,146.0	11,338.0	12,897.0	38,417.0	74,876.0
1975	10,283.8	0.606,6	23,208.1	43,400.9	7,014.6	9,963.1	13,354.5	14,859.8	45,192.0	88,592.9
1980		10,800.2	24,918.3	47,080.7	7,760.0	10,916.3	15,346.6	16,160.6	50,183.5	97,264.2
••										

1/ See methodology section in the appendix for detailed discussion on derivation of data in this table. 2/ Total based on July 1-June 30 trade plus calendar year production. For example, 1956-60 corresponds to 1956/57-1960/61 trade, and 1956-60 production.

3/ Seed use calculated using seeding rates and area planted. See methodology section in the appendix for appropriate seeding

 $\frac{4}{2}$ 5 percent of production.

Sources: $(\underline{22})$ and app. tables 1 and 5.

Table 20--Composition of grain consumed as food in Eastern Europe, average 1966-70

	:		:		:	Other	:	
Country	:	Wheat	:	Rye	:	coarse	:	Rice
	:		:		:	grain	:	
	•							
	:				Perc	ent		
	:							
Czechoslovakia	.:	73.8		20.6		2.5		3.1
East Germany	.:	53.2		41.0		3.9		1.9
Poland	.:	55.7		39.1		4.1		1.0
	:							
Bulgaria	. :	86.2		1.3		11.0		1.5
Hungary		88.2		9.4				2.4
Romania 1/		64.3		2.0		33.7		1.7
Yugoslavia		84.8		2/		14.5		0.7
	:							

^{1/ 1970.}

Source: Table 16.

Projections

Grain utilization in Eastern Europe is expected to increase through 1980, although the rate of increase will tend to decrease during the latter half of the 1970's. Total grain consumption is projected to reach 97 million tons by 1980, compared with an average of 75 million tons during 1966-70.

In contrast to an expected increase in per capita livestock product consumption, a decreasing per capita food grain consumption is projected for Eastern Europe. This decrease will be more marked in the northern countries than in the southern ones. For example, annual per capita food consumption of grain in East Germany is projected to fall from 124 kilograms in 1966-70 to 117 kilograms in 1980. While this is well above the anticipated consumptio level in West Germany and France, it is considerably below that in Italy.

Total East European food grain consumption is the result of opposing trends: per capita consumption decreases and population increases. Decreases in use generally outweigh increases in population, so that total food grain consumption in 1980 is projected to decrease in every East European country except Romania and Yugoslavia. In these two countries, a continuation of the switch from reliance on corn as the staple food to wheat is expected.

Aggregate food grain consumption for the region is not expected to change significantly from historical levels. During 1966-70, food grain consumption averaged 24.2 million tons per year; 1980 consumption is projected at 23.7 million tons, reflecting a small decrease in food grain consumption in the northern countries.

^{2/} Small amount of rye included in wheat.

Livestock requirements will continue to account for the major grain use in Eastern Europe through 1980. In keeping with planned accelerated growth in the livestock sector, consumption of grain for feed is projected to reach 62 million tons by 1980--almost two-thirds of total grain utilization. During 1966-70, grain for feed averaged less than 41 million tons annually, or 54 percent of total grain use.

To project East European feed grain consumption to 1975 and 1980, the feed requirements developed in table 12 were used. It is generally expected that a more intensive East European livestock economy will result in more substitution of concentrated feeds for roughages. Consequently, the level of concentrate feeding for meat and milk production will increase but that for egg production will fall from the generally high levels of the late 1960's. At the same time, the roughage requirement per unit of animal product is expected to decrease, particularly in the northern countries. Both changes will result in a greater percentage of total feed attributed to concentrates. Total requirements for concentrated feeds, by livestock product category, are detailed in table 21.

Total grain utilization in Eastern Europe is projected to reach 97.3 million tons by 1980--up 30 percent over the 1966-70 annual average. While livestock feeding of grain will account for almost all of this increase, improved feeding efficiency, particularly after 1975, will keep the increase within relatively modest limits.

Consumption of Protein Meals

Trends

From 1956-60 to 1966-70, consumption of oilseed and fish meal almost tripled, from an annual average of 1.1 million tons to over 3.2 million (table 22). This increase represents an annual growth rate of over 11 percent. During the same period, hog numbers and cattle numbers each increased about 14 percent. Each country showed consistent growth in protein meal consumption, ranging from slightly less than 8 percent annually in Romania to over 15 percent in Yugoslavia.

Another way of viewing the increasing importance of protein meals in Eastern Europe is through comparison of protein meal consumption with consumption of total concentrates (table 23). 11/ While protein meal consumption is only a small percentage of total concentrate consumption in Eastern Europe (7.4 percent during 1966-70), its share of concentrate consumption has increased rapidly. During 1961-65, 5.4 percent of concentrates were protein meals, up from the 1956-60 estimate of less than 4 percent. In comparison, protein meal represents almost 25 percent of concentrate consumption in the Netherlands, and more than 15 percent in the United Kingdom (39).

^{11/} Protein meals and grains consumed as animal feed.

Table 21--Estimated animal feed demand for grains, oilmeal, and fish and meat meal, by livestock product and horses, Eastern Europe, average 1966-70 and projections to 1975 and 1980

-		Grains			Oilmeal		: Fish	and meat n	meal
Country and product:	1966-70	1975	1980	1966-70	1975	1980	1966-70	1975	1980
				1,000	metric t	ons			
Czechoslovakia:									
Beef	7.607	83.	031.					5.	
Pork	2,447.8		,876.	131.4	188.6	250.4	32.1	47.7	65.5
Poultry	429	685.4	772.0	26.3	52.1			3,	18.4
Mutton	e.	.2	.2	0	0	0	0	0	0
Total meat	3,587.4	99.						9	
Milk	459.1	559.5	624.	29.3	77.3	94.2	7.3	10.5	13.8
Eggs	765.0	95.						5	
Horses	244.3	3	55.				0		
Total	5,055.8	7	7,493.0				81.0	133.0	180.0
East Germany:									
Beef	532.0			·	9	172.0	-	6	0.44
Pork	3,064.1			0	δ.	520.0	0.99	00	137.0
Poultry:	322.0	429.0	506	32.0	54.0	73.0	9	14.0	19.0
Mutton	6.			0	0	0	0	0	0
Total meat	3,919.0		,283.	6	5.	765.0	83.0	i	200.0
Milk	0.499			7		4.	14.0	28.0	40.0
Hggs.	937.0		,112.	5.	2	61.		3,	42.0
Horses	147.0			15.0	0.6	8.0		0	0
Total	5,667.0			3		•	116.0	212.0	282.0
Poland:									
Beef	814.7	,687.	,155.	4.	0	ij		2	
Pork	3,466.2	5,472.2	5,647.0	172.6	322.5	425.9	48.6	93.2	116.8
Poultry	921.3	,352.	,806.	ŵ	9	5	21.0	9.	3.
Mutton	6.		.7	0	0	0	0	0	0
Total meat	5,203.1	512.	,610.	5	591.8	793.1	i.	5.	
Milk	1,022.7		•	53.	151.3	213.8	14.1	42.0	61.2
Eggs	1,654.8	782.	,116.	15.	174.6	264.8	Ċ	9	
Horses	2,048.9	983	15,902.0	116.8	163.2	153.4	125.9		355.7
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.717.0	1001	. 100			, 740.	,	• •	,

Table 21--Estimated animal feed demand for grains, oilmeal, and fish and meat meal, by livestock product and horses, Eastern Europe, average 1966-70 and projections to 1975 and 1980--Continued

		Grains		••	Oilmeal		: Fish	and meat	mea1
Country and product:	1966-70	1975	1980	1966-70	1975	1980	1966-70	1975	1980
				1,000	metric t	ons			
Bulgaria:									
Beef	324.3	518.0	680.7	0	37.9	53.0			5.4
Pork	1,384.2	1,740.9	2,034.0	86.0	120.0	160.3	6.8	14.4	18.2
Poultry	473.6	713.6	891.8	9.	7	71.7	2.4	5.6	7.5
Mutton	202.4	245.3	282.2	0	0	0	0	0	0
Total meat:	2,384.5	3,217.8	3,888.7	5	205.0	285.0			31.1
Milk	170.8	254.	294.1	11.9	20.4	26.3	6.	2.3	3.0
Eggs	448.8	509.5	560.2	2	70.8	93.5	_		10.8
Horses	158.1	125.8	106.6	6	14.8	13.1	0	0	0
Total	3,162.2	4,108.0	4,849.6	6.	311.0	417.9	15.9	35.1	6.44
••									
Hungary:									
Beef	224.0	331.0	35.		26.	38.0	2.0		7.0
Pork	2,266.0	3,018.0	,273.	147.0	243.0	305.0	21.0	45.0	58.0
Poultry	0.199	962.0	1,158.0			0.66	0.9		21.0
Mutton	36.0	43.0		0	0	0	0	0	0
Total meat:	3,187.0	4,354.0	,910.		341.0	442.0	27.0		84.0
Milk	1,269.0	,731.			40.	189.0	11.0	25.0	33.0
E888	712.0	916.	,032.		6	108.0	5.0		9.
Horses	213.0	151.0	110.0	13.0	12.0	10.0	0	0	0
Total	5,381.0	7,152.0			2	749.0	45.0	101.0	138.0
••									
Romania:									
Beef	493.0	637.2	771		7.	78.2	7.	∞.	6.
Pork	1,940.8	3,106.3	321	197.8	277.9	382.0	1.3	2.8	3.3
Poultry	488.6	748.2	,047		į.	92.0	7.		1.0
Mutton	161.8	186.4	218.7	0	0	0	0	0	0
Total meat	3,084.2	4,678.1	6,359.2		396.2	552.2	2.1		5.2
Milk	411.4	501.7	602.5			59.6	۳.	∞.	6.
Eggs	836.1	1,138.0	1,266.9		147.2	182.0	9.		1.9
Horses	402.0	355.2	321	14		12.2	0	0	
Total	4,733.7	6,673.0	8,550.0		9.909	806.0	3.0	7.0	8.0

Table 21--Estimated animal feed demand for grains, oilmeal, and fish and meat meal, by livestock product and horses, Eastern Europe, average 1966-70 and projections to 1975 and 1980--Continued

Total Eastern Europe: 19.66-70; 1975; 1980; 1966-70; 1975; 1980; 1966-70; 1975; 1980 Total Eastern Europe: 6,566.6 8,372.1 9,491.1 249.6 466.1 629.0 59.0 116.0 161.0 162.1 90.0 10.0 164.5 118.0 116		••	Grains			Oilmeal		Fish	and meat	meal
1,000 metric tons 1,007.1 1,372.6 1,570.9 37.5 71.3 98.8 10.1 19.0 53.3 3,022.3 3,882.8 4,442.7 106.3 207.4 278.0 29.1 55.3 12.3 115.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Country and product	: 1966-70	1975	1980	1	1975		1		
1,0057.1 1,372.6 1,570.9 37.5 71.3 98.8 10.1 19.0 23.022.3 3,882.8 4,442.7 106.3 207.4 278.0 29.1 55.3 12.3 115.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		••								
1,057.1 1,372.6 1,570.9 37.5 71.3 98.8 10.1 19.0 3,022.3 3,882.8 4,442.7 106.3 207.4 278.0 29.1 55.3 577.5 927.4 1,095.6 20.8 45.7 67.9 5.5 12.3 115.0 115.0 0 0 0 0 0 4,771.9 6,296.8 7,224.2 164.6 32.4 4,44.7 44.7 86.6 11 505.6 626.6 702.9 19.0 164.6 35.0 44.7 44.7 86.6 11 656.9 896.0 1,058.9 35.0 74.6 108.2 9.3 20.0 632.2 552.7 505.1 31.0 32.1 30.2 9.4 632.2 552.7 505.1 31.0 32.1 629.0 59.0 116.0 6,566.6 8,372.1 9,491.1 249.6 466.1 629.0 59.0 116.0 4,154.8 6,339.2 7,825.1 265.6 491.3 693.6 47.1 98.9 12. 4,154.8 5,884.7 2,775.5 2,775.6 3,684.7 299.1 569.6 76. 5173.1 <td></td> <td>••</td> <td></td> <td></td> <td>1,00</td> <td></td> <td>ons</td> <td></td> <td></td> <td></td>		••			1,00		ons			
1,057.1 1,372.6 1,570.9 37.5 71.3 98.8 10.1 19.0 3,022.3 3,882.8 4,442.7 106.3 207.4 278.0 29.1 55.3 3,022.3 3,882.8 4,442.7 106.3 207.4 278.0 29.1 55.3 115.0 115.0 0 0 0 0 4,771.9 6,296.8 7,224.2 164.6 324.4 444.7 44.7 86.6 11 656.9 896.0 1,058.9 35.0 74.6 108.2 9.3 20.0 9.4 656.9 896.0 1,058.9 35.0 74.6 108.2 9.3 20.0 632.2 552.7 505.1 31.0 32.1 30.2 0 6,32.2 552.7 505.1 31.0 32.1 30.2 0 6,56.6 8,372.1 9,491.1 249.6 466.1 629.0 59.0 116.0 4,154.8 6,339.2 7,825.1 265.6 491.3 693.6 47.1 98.9 12. 4,154.8 6,339.2 7,825.1 1,784.4 2,321.6 203.9 47.1 98.9 12. 591.3 6,884.7	Yugoslavia:									
3,022.3 3,882.8 4,442.7 106.3 207.4 278.0 29.1 55.3 5 577.5 927.4 1,095.6 20.8 45.7 67.9 5.5 12.3 1 115.0 114.0 115.0 0 0 0 0 4,771.9 6,296.8 7,224.2 164.6 324.4 444.7 44.7 86.6 11 505.6 626.6 7,022.9 19.0 35.0 45.9 5.0 9.4 1 656.9 896.0 1,058.9 35.0 74.6 108.2 9.3 20.0 0 6,566.6 8,372.1 9,491.1 249.6 466.1 629.0 59.0 116.0 16 6,566.6 8,372.1 2,491.1 2,491.1 1,784.4 2,321.6 203.9 365.4 47 3,873.6 5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 12 517.3 590.7 661.8 0 0 0 0 26,137.1 36,632.5 42,955.9 1,682.8 2,757.6 3,684.7 299.1 569.6 76 6,100.6 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 2 3,845.5 3,331.2 3,021.3 2,745.2 4,415.9 5,798.0 445.8 868.1 1,10	Beef	: 1,057.1	1,372.6	1,570.9	37.5	71.3	98.8	10.1	19.0	26.4
577.5 927.4 1,095.6 20.8 45.7 67.9 5.5 12.3 1 115.0 114.0 115.0 0	Pork	: 3,022.3	3,882.8	4,442.7	106.3	207.4	278.0	29.1	55.3	74.9
115.0 114.0 115.0 <	Poultry	: 577.5	927.4	1,095.6	20.8	45.7	67.9	5.5	12.3	18.4
4,771.9 6,296.8 7,224.2 164.6 324.4 444.7 44.7 86.6 11 505.6 626.6 702.9 19.0 35.0 45.9 5.0 9.4 505.6 896.0 1,058.9 35.0 74.6 108.2 9.3 20.0 656.9 896.0 1,058.9 35.0 74.6 108.2 9.3 20.0 632.2 552.7 505.1 31.0 32.1 30.2 0 0 6,566.6 8,372.1 9,491.1 249.6 466.1 629.0 59.0 116.0 16 4,154.8 6,339.2 7,825.1 265.6 491.3 693.6 48.1 105.3 12 17,591.4 23,884.2 27,190.5 1,147.1 1,784.4 2,321.6 203.9 47.1 98.9 12 3,873.6 5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 12 26,137.1 36,627.3 3,047.3	Mutton	: 115.0	114.0	115.0	0	0	0	0	0	0
505.6 626.6 702.9 19.0 35.0 45.9 5.0 9.4 1 656.9 896.0 1,058.9 35.0 74.6 108.2 9.3 20.0 632.2 552.7 505.1 31.0 32.1 30.2 0 0 6,566.6 8,372.1 9,491.1 249.6 466.1 629.0 59.0 116.0 16 4,154.8 6,339.2 7,825.1 265.6 491.3 693.6 48.1 105.3 12 17,591.4 23,884.2 27,190.5 1,147.1 1,784.4 2,321.6 203.9 365.4 4 3,873.6 5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 1 26,137.1 36,632.5 1,682.8 2,757.6 3,684.7 299.1 569.6 76 4,502.6 6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 6,010.6 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 1,18.0 3,845.5 3,331	Total meat	: 4,771.9	•		164.6	324.4	444.7	44.7	9.98	119.7
656.9 896.0 1,058.9 35.0 74.6 108.2 9.3 20.0 632.2 552.7 505.1 31.0 32.1 30.2 0 0 6,566.6 8,372.1 9,491.1 249.6 466.1 629.0 59.0 116.0 16 4,154.8 6,339.2 7,825.1 265.6 491.3 693.6 48.1 105.3 12 17,591.4 23,884.2 27,190.5 1,147.1 1,784.4 2,321.6 203.9 365.4 4/5 3,873.6 5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 1 26,137.1 36,61.8 0 0 0 0 0 0 0 26,137.1 36,632.5 42,955.9 1,682.8 2,757.6 3,684.7 299.1 569.6 76 4,502.6 6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 1 3,845.5 3,331.2 3,021.3 2,745.2 4,415.9 5,798.0 445.8 868.1 1,16	Milk	: 505.6	626.6	702.9	19.0	35.0	45.9	5.0	9.4	12.4
6,566.6 8,372.1 505.1 31.0 32.1 30.2 0 0 0 6,566.6 8,372.1 9,491.1 249.6 466.1 629.0 59.0 116.0 16 4,154.8 6,339.2 7,825.1 265.6 491.3 693.6 48.1 105.3 15 17,591.4 23,884.2 27,190.5 1,147.1 1,784.4 2,321.6 203.9 365.4 47 3,873.6 5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 15 517.3 590.7 661.8 0 0 0 0 26,137.1 36,632.5 42,955.9 1,682.8 2,757.6 3,684.7 299.1 569.6 76 4,502.6 6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 16 6,010.6 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 2 3,845.5 3,331.2 3,021.3 225.0 252.6 231.9 0 0 40,495.8 53,786.1 61,853.7 2,745.2 4,415.9 5,798.0 445.8 868.1 1,16		: 656.9	0.968	1,058.9	35.0	74.6	108.2	9.3	20.0	28.9
6,566.6 8,372.1 9,491.1 249.6 466.1 629.0 59.0 116.0 4,154.8 6,339.2 7,825.1 265.6 491.3 693.6 48.1 105.3 17,591.4 23,884.2 27,190.5 1,147.1 1,784.4 2,321.6 203.9 365.4 3,873.6 5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 26,137.1 36,632.5 42,955.9 1,682.8 2,757.6 3,684.7 299.1 569.6 4,502.6 6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 6,010.6 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 3,845.5 3,331.2 3,021.3 225.0 24,415.9 5,798.0 445.8 868.1 1,	Horses	: 632.2	552.7	505.1	31.0	32.1	30.2	0	0	0
4,154.8 6,339.2 7,825.1 265.6 491.3 693.6 48.1 105.3 17,591.4 23,884.2 27,190.5 1,147.1 1,784.4 2,321.6 203.9 365.4 3,873.6 5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 517.3 590.7 661.8 0 0 0 0 26,137.1 36,632.5 42,955.9 1,682.8 2,757.6 3,684.7 299.1 569.6 4,502.6 6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 6,010.6 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 3,845.5 3,331.2 3,021.3 225.0 252.6 231.9 0 0 40,495.8 53,786.1 61,853.7 2,745.2 4,415.9 5,798.0 445.8 868.1 1,	Total		•	,491.	249.6	466.1	629.0	59.0	116.0	161.0
4,154.8 6,339.2 7,825.1 265.6 491.3 693.6 48.1 105.3 17,591.4 23,884.2 27,190.5 1,147.1 1,784.4 2,321.6 203.9 365.4 3,873.6 5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 517.3 590.7 661.8 0 0 0 0 26,137.1 36,632.5 42,955.9 1,682.8 2,757.6 3,684.7 299.1 569.6 4,502.6 6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 6,010.6 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 3,845.5 3,331.2 3,021.3 225.0 252.6 231.9 0 0 40,495.8 53,786.1 61,853.7 2,745.2 4,415.9 5,798.0 445.8 868.1 1,		••								
4,154.8 6,339.2 7,825.1 265.6 491.3 693.6 48.1 105.3 17,591.4 23,884.2 27,190.5 1,147.1 1,784.4 2,321.6 203.9 365.4 3,873.6 5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 517.3 590.7 661.8 0 0 0 0 26,137.1 36,632.5 42,955.9 1,682.8 2,757.6 3,684.7 299.1 569.6 4,502.6 6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 6,010.6 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 3,845.5 3,331.2 3,021.3 225.0 252.6 231.9 0 0 40,495.8 53,786.1 61,853.7 2,745.2 4,415.9 5,798.0 445.8 868.1 1,	Total Eastern Europe	••								
23,884.2 27,190.5 1,147.1 1,784.4 2,321.6 203.9 365.4 5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 590.7 661.8 0 0 0 0 36,632.5 42,955.9 1,682.8 2,757.6 3,684.7 299.1 569.6 6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 3,331.2 3,021.3 225.0 252.6 231.9 0 0 53,786.1 61,853.7 2,745.2 4,415.9 5,798.0 445.8 868.1 1,	Beef	: 4,154.8	339.	7,825.1	265.6	491.3	693.6	48.1	105.3	153.4
5,818.4 7,277.5 270.1 481.9 669.5 47.1 98.9 590.7 661.8 0 0 0 0 36,632.5 42,955.9 1,682.8 2,757.6 3,684.7 299.1 569.6 6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 3,331.2 3,021.3 225.0 252.6 231.9 0 0 53,786.1 61,853.7 2,745.2 4,415.9 5,798.0 445.8 868.1 1,	Pork	:17,591.4	,884.	27,190.5	1,147.1	1,784.4	2,321.6	203.9	365.4	472.7
590.7 661.8 0	Poultry		,818.	7,277.5	270.1	481.9	669.5	47.1	98.9	138.1
36,632.5 42,955.9 1,682.8 2,757.6 3,684.7 299.1 569.6 6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 3,331.2 3,021.3 225.0 252.6 231.9 0 0 53,786.1 61,853.7 2,745.2 4,415.9 5,798.0 445.8 868.1 1,	Mutton		590.7	661.8	0	0	0	0	0	0
6,552.7 7,597.3 304.3 586.2 782.8 52.6 118.0 7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 3,331.2 3,021.3 225.0 252.6 231.9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total meat	:26,137.1	9	42,955.9	•	,757	•	299.1	569.6	764.2
7,269.7 8,279.2 533.1 819.5 1,098.6 92.1 178.5 3,331.2 3,021.3 225.0 252.6 231.9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Milk	: 4,502.6	6,552.7	7,597.3	304.3	586.2	782.8	52.6	118.0	164.3
3,331.2 3,021.3 225.0 252.6 231.9 0 0 0 53,786.1 61,853.7 2,745.2 4,415.9 5,798.0 445.8 868.1	Eggs.	9.010,9:	7,269.7	8,279.2	533,1	819.5	,098	92.1	178.5	239.1
53,786.1 61,853.7 2,745.2 4,415.9 5,798.0 445.8 868.1	Horses	: 3,845.5	3,331.2	3,021.3	225.0	\sim	231.9	0	0	0
	Total	:40,495.8	1	,853.	2,745.2	,415	,798	445.8	868.1	1,169.6
		•								

Sources: Tables 12, 37, and 38.

Table 22--Consumption of protein meal of animal and vegetable origin <u>1</u>/ in tastern turope, averages 120-00, 1961-65, and 1966-70 and projections to 1975 and 1980

Country and period	Domestic oilseed produc- tion	Net oilseed trade 2/	Total oilseed supply	: Oilmeal : available : from : oilseed 3/:	Net oilmeal trade	: Total : oilmeal : require- : ment	Fish-: meal: produc-:	Net fish- meal imports	Total: fish-: meal: supply:	Total protein meal re- quirements
					1,000 m	metric tons				
Czechoslovakia: 1956-60. 1961-65. 1966-70. 1975.	71 76 80 85 89	121 113 141 0	192 189 221 85 89	110 104 124 47 50	42 93 204 484 633	152 197 338 531 683	0 0 0 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	8 41 81 4/ 4/	8 41 81 133 180	160 238 409 664 863
East Germany: 1956-60. 1961-65. 1966-70. 1975.	187 186 229 230 235	290 133 127 0	477 319 356 230 235	248 168 185 120 123	7 129 388 728 965	255 297 573 848 1,088	0 0 0 7 4 / 4	$\frac{3}{54}$ 116 $\frac{4}{4}$	3 54 116 212 282	258 351 689 1,060 1,370
Poland: 1956-60 1961-65 1966-70 1975.	160 387 583 715 809	83 38 -44 0	243 425 539 715 809	155 253 323 429 485	37 111 258 652 940	192 364 581 1,081 1,425	$\begin{array}{c} 2\\11\\27\\4/\\4/\end{array}$	33 35 4/ 4/	5 46 126 264 356	197 410 707 1,345 1,781
Total Northern Countries: 1956-60. 1961-65. 1966-70. 1975.	418 649 891 1,029 1,133	494 284 224 0	912 933 1,115 1,029 1,133	513 525 633 596 658	86 333 856 1,864 2,538	599 858 1,482 2,460 3,196	$\begin{array}{c} 2\\11\\27\\\frac{4}{4}/\end{array}$	14 129 206 $\frac{4}{4}$	16 140 323 609 818	615 998 1,805 3,069 4,014
Bulgaria: 1956-60. 1961-65. 1966-70. 1975.	284 369 507 583 649	- 29 - 73 - 90 0	255 296 417 583 649	105 110 154 216 240	24 72 96 178	105 134 216 311 418	0 0 0 7 7 7	0 7 7 1 1 6 7 7 1 7 1 7 1 7 1 7 1 7 1 7 1	0 4 16 35 45	105 138 232 346 462
Hungary: 1956-60 1961-65 1966-70 1975.	109 122 127 130 130	50 20 29 0	159 142 156 130 130	87 67 70 61 61	5/6 146 267 551 688	93 213 337 572 749	0 0 0 4 4	2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	2 27 45 101 138	95 240 382 673 888
see notes at end of table.										Continued

Table 22--Consumption of protein meal of animal and vegetable origin 1/ in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980--Continued

Country and period	oilseed produc- tion	: oilseed : trade : 2/	oilseed supply	: available : from : oilseed 3	e oilmeal 3/; trade	: oilmeal : require- : ment	: meal : produc- : tion	: fish- : meal : imports	: fish- : meal : supply	protein meal re-
					1,000	1,000 metric tons				
Romania: 1956-60			429	236	-13	5/ 223	1	1	1	223
1961–65	566 826	<u>5</u> / -26 -62	540	297	8 - R			0 m	3.2	291
1975.	1,231	00	1,231	677 926	-70 -120	607 806	/ 1 / 1 /	7 7	0 / 8	614
Yugoslavia:	113	17	130	77,	;	7,7	;	~	~	7
1961–65	225	21	246	135	77	212		t ⊗ t	T 8 t	230
1966-70	319	-11	308	169	81	250	+	59	59	309
1975	470	00	470	254	212	997	/ 1 /	/ 1 /	116	582
• • • • • • • • • • • • • • • • • • • •				170		640	rl	11	101	
Total Southern Countries:										
1956-60		32	926	502		495	1	9	9	501
1961–65	1,282	-58	1,224	609	239	848	1	51	51	899
1966-70		-134	1,646	813	450	1,253	1	123	123	1,376
1975	2,414	0	2,414	1,207	789	1,956	/7	/4/	259	2,215
1980	3,058	0	3,058	1,548	1,054	2,602	/4/	/4/	352	2,954
Total Eastern Europe:										
1956-60	1,359	526	1,885	1,015	79	1,094	2	20	22	1,116
1961-65	1,931	226	2,157	1,134	572	1,706	11	180	191	1,897
1966-70	2,671	06	2,761	1,445	1,300	2,735	27	419	446	3,181
1975	3,443	0	3,443	1,803	2,653	4,416	/4/	/4	898	5,284
1980	161 7	C	7 1 9 1	2 206	3 502	708	/ 17	/ '/	1 170	6.968

1/10 only oilseeds commonly used in animal feedings were considered. These are linseed, peanuts, rapeseed, soybeans, and sunflowerseed. 1/10 only oilseeds commonly used in animal feedings were considered. These are linseed, peanuts, rapeseed, soybeans, and sunflowerseed. 1/10 Based on meal extraction factors in 1/10 in 1/10 in 1/10 based on meal extraction factors in 1/10 in 1/

9, 19, 28, 29, 37, 48, 52, 74, 81). 9 Sources:

Table 23--Consumption of protein meal and grain for livestock feed in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980

Country and period :	Protein meal	: Grain	: Total concentrate :	Protein meal as a percentage of total concentrate
· :		- 1,000 met	tric tons	Percent
Czechoslovakia:				
1956-60:	159.2	3,580.6	3,739.8	4.3
1961-65:	232.1	3,834.0	4,066.1	5.7
1966-70:	423.1	5,055.8	5,478.9	7.7
1975:	664.3	6,547.0	7,211.3	9.2
1980:	862.8	7,493.0	8,355.8	10.3
East Germany:				
1956-60	227.2	4,523.8	4,751.0	4.8
1961-65	351.0	4,617.6	4,968.6	7.1
1966-70		5,667.2	6,362.7	10.9
1975		6,652.0	7,712.0	13.7
1980		7,515.0	8,904.6	15.6
1,000	1,507.0	7,515.0	0,704.0	15.0
Poland: :				
1956-60:	196.3	6,906.8	7,103.1	2.8
1961-65:	409.5	8,691.0	9,100.5	4.5
1966-70:	715.6	9,979.4	10,695.0	6.7
1975:		14,282.0	15,627.3	8.6
1980:	•	15,902.0	17,683.0	10.0
Total northern coun- : tries:				
1956-60:		15,011.2	15,637.6	4.0
1961-65:		17,142.6	18,135.2	5.5
1966-70:		20,701.4	22,535.6	8.1
1975:	3,069.6	27,481.0	30,550.6	10.0
1980:	4,013.4	30,910.0	34,923.4	11.5
Bulgaria:				
1956-60:	106.4	1,760.8	1,867.2	5.7
1961-65:	110.3	2,211.2	2,321.5	4.7
1966-70:	255.5	3,161.2	3,416.7	7.5
1975:	346.0	4,108.0	4,454.0	7.8
1980:	462.4	4,850.0	5,312.4	8.7
Hungary:				
Hungary: :	112.3	3,986.9	4,099.2	2.7
1961-65	234.6	4,553.2	4,787.8	4.9
				6.6
1966 - 70		5,380.7	5,761.5	8.6
		7,152.4	7,825.4	9.9
1980	887.5	8,053.0	8,940.5	₹.7
See notes at end of t	able.			Continued

Table 23--Consumption of protein meal and grain for livestock feed in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980--Continued

Country and period :	Protein meal	: Grain	: Total concentrate	: Protein meal as: a percentage of: total concentrate
:		<u>1,000 m</u>	etric tons	Percent
Romania: :				
1956-60 1/:	200.0	2,685.6	2,885.6	6.9
1961-65:	294.4	3,631.3	3,925.7	7.5
1966-70:	427.3	4,733.8	5,161.1	8.3
1975:	613.4	6,673.0	7,286.4	8.4
1980:	814.1	8,550.0	9,364.1	8.7
: Yugoslavia: :				
1956-60:	78.7	4,292.2	4,370.9	1.8
1961-65:	227.3	4,682.6	4,909.9	4.6
1966-70:	340.7	6,566.6	6,907.5	4.9
1975:	582.0	8,372.1	8,954.1	6.5
1980:	790.0	9,492.0	10,282.0	7.7
: : Total southern coun				
tries:				
1956-60	497.4	12,725.5	13,222.9	3.8
1961-65:		15,466.3	16,362.9	5.5
1966-70:		19,343.2	21,231.4	6.5
1975:		26,305.5	28,520.5	7.8
1980:		30,945.0	33,899.0	8.7
: : Total Eastern Europe:				
1956-60		27,636.7	28,760.5	3.9
1961-65:		32,608.9	34,498.1	5.5
1966-70	•	40,545.6	43,768.0	7.4
1975	,	53,786.5	59,071.1	8.9
1980:		61,855.0	68,822.4	10.1

^{1/} ERS estimates.

Sources: Tables 19 and 22.

Further insight into the nature of protein meal consumption can be gained through analysis of the origin of protein meals. During 1956-60, more than 98 percent of all protein meal consumption was of vegetable origin, primarily rapeseed meal, sunflowerseed meal, soybean meal, and peanut meal. The remainder was fishmeal, virtually all of which was imported. During 1966-70, oilseed meals still dominated total protein meal consumption, although their share of total had dropped below 90 percent. All of the remaining high protein feed consumed was imported fishmeal, except in Poland, which is a fishmeal producer. All the northern countries consumed more fishmeal than did the southern countries.

Significant shifts have occurred in the source of oilseed meal consumed in Eastern Europe since the mid-1950's. There has been a noticeable trend away from domestically crushed oilmeals toward imported oilmeals. During 1956-60, almost 1 million (90 percent) of the 1.1 million tons of annual oilmeal consumption was crushed domestically, primarily from domestic oilseed production. By 1966-70, this percentage had decreased to just over 50 percent. There are several possible explanations for this increased use of imported oilmeals. First, domestic oilseed production, although expanding rapidly in most East European countries, has not been able to supply the oilmeals required of an expanding and more efficient livestock economy. Thus, oilseeds have had to be imported and crushed, or oilmeal itself has had to be imported. latter course seems to have been the one taken. From 1956 to 1970, net oilseed imports declined, and net oilmeal imports increased almost twelvefold. Every East European country has shown a sizable increase in net oilmeal imports. One reason is that the facilities to crush oilseeds have been limited. A second possibility is related to the disposal of vegetable oil resulting from oilseed crushing. Since per capita consumption of vegetable oil in Eastern Europe is quite low, there is little reason for oilseeds to be crushed for oil. Depending on oilseed and oilmeal import prices, there may be some advantage to importing oilmeals rather than expanding domestic crushing capacity.

Projections

In analyzing feed requirements of Eastern Europe, we divided 1956-70 consumption of feed concentrates so that the protein meal-grain percentage breakdown could be arrived at (table 23). Protein meal was expressed as a percentage of total concentrates. This percentage was projected to 1975 and 1980 using a simple linear trend, and the projected future percentage was used to project 1975 and 1980 grain and protein meal consumption. For example, protein meal in Czechoslovakia made up 4.3 percent of total concentrate consumption in 1956-60, 5.7 percent in 1961-65, and 7.7 percent in 1966-70. This percentage was projected at 9.2 percent in 1975 and 10.3 percent in 1980. Based on the assumed feed requirements, Czechoslovakia will consume close to 8.4 million tons of concentrates in 1980; 10.3 percent (nearly 0.9 million tons) of this will be protein meal, and the remainder grain. In a similar manner, protein meal was subdivided according to vegetable and animal origin (table 22).

Based on this analysis, East European protein meal requirements will be approximately 7.0 million tons in 1980, up from 3.2 million tons annually during the 1966-70 base years. The bulk of this protein meal will be of vegetable origin. The northern countries will require 4.0 million tons of protein meal, and the southern countries will need 3.0 million tons.

The percentage share of protein meal in total consumption of concentrates in Eastern Europe has risen in the recent past, and is projected to reach 10.1 percent in 1980. The highest anticipated level--15.6 percent in East Germany-is well under current levels in advanced Western countries. Increasing protein meal consumption is the major reason for the projected slowdown in the rate of growth in grain used for feed in Eastern Europe during the late 1970's.

Consumption of Roughages

Trends

Consumption of concentrates is in part a function of the supply of roughages. Within limits, in any country, as the relative supply of roughages decreases, consumption of concentrated feed can be expected to increase. As urbanization and other developments continue to remove land from agricultural use, production of roughages may drop though their quality may improve. This to some extent will increase the consumption of concentrated feed. But East European trends in roughage consumption have been less discernible than trends for other feed categories, making such projections particularly dependent on assumed changes in the structure of livestock production and in feeding efficiency.

Hay is the most important roughage consumed in Eastern Europe. During 1956-70, consumption of hay increased in every East European country; by 1966-70 it had reached an annual average of almost 52 million tons (table 24). Cattle numbers increased from 29 million in 1956-60 to 33 million in 1966-70, and horse numbers dropped from 7 to 5 million.

The next most important roughage has been potatoes, fed primarily to hogs but also to cattle. Potato consumption occurs almost exclusively in the north primarily in Poland. Despite the inferiority of potatoes as a livestock feed. Poland has tended to increase this use in recent years.

Corn silage and green feed (grass, beet tops, and so forth, chopped for feed) used as cattle feed are other important roughages. Consumption trends, however, have been quite erratic. In general, consumption has trended upward in the northern countries while falling in the southern ones. Fodder beet consumption has followed a course similar to that of silage and green feed in recent years.

The most noticeable stability in roughage consumption in Eastern Europe relates to pasture. Area and carrying capacity rather than tonnage must be used to measure the contribution of permanent pastures. While there are opposing trends in area devoted to permanent pasture among East European

Table 24--Availability $\underline{1}/$ of roughages in Eastern Europe, averages 1956-60, 1961-65, 1966-70 and projections to 1975 and 1980

Country and period :	Corn silage and green silage	: Hay	Fodder beets	Potatoes	Permanent pasture
:		1,000 me	tric tons		1,000 hectares
: Czechoslovakia:					
1956-60	3,359.3	8,371.0	2,807.1	3,011.8	843.0
1961-65	4,703.2	7,814.0	2,373.3	2,019.0	788.0
1966-70	5,387.2	9,160.4	3,239.6	3,239.6	790.0
1975	5,547.7	9,953.0	2,754.1	1,850.2	773.0
1980:	5,696.7	10,557.0	1,836.0	1,700.2	764.0
Cast Germany:					
1956-60	4,695.6	6,047.0	9,739.1	7,751.0	431.0
1961-65	6,794.0	6,077.0	7,429.5	6,510.0	528.0
1966-70	7,860.0	7,294.0	9,178.6	6,249.4	592.0
1975	8,640.0	8,274.0	7,790.4	5,908.8	686.0
1980:	9,180.0	9,059.0	7,395.4	5,666.3	752.0
:					
Poland: :	1 217 7	11 070 0	/. 227 2	17 071 0	1 700 0
1956-60	1,317.7	11,878.0	4,237.2	17,871.0	1,790.0
1961-65	2,531.2	14,725.0	5,592.6 7,045.2	21,424.0	1,772.0
1966-70	3,305.7	20,116.0	,	26,259.4	1,683.0
1975:	4,050.0	23,935.0	8,834.4	32,089.0	1,705.0
1980:	4,500.0	27,286.0	10,177.2	36,358.0	1,720.0
Cotal northern countries: :	\				
1956-60:	9,372.6	26,296.0	16,783.4	28,633.8	3,064.0
1961-65	14,028.4	28,616.0	15,395.4	29,953.0	3,088.0
1966-70:	16,552.9	36,570.4	19,463.4	34,414.4	3,065.0
1975:	18,237.7	38,343.0	19,378.9	39,848.0	3,164.0
1980:	19,376.7	46,902.0	19,408.6	43,724.5	3,236.0
· Bulgaria:					
1956-60	1,695.7	1,481.0	518.4		776.0
1961-65:	2,316.7	1,790.0	395.1		900.0
1966-70:	2,490.6	2,231.6	736.4		1,113.0
1975	2,616.0	2,540.0	903.6		1,110.0
1980:	2,706.7	2,778.0	1,037.7		1,105.0
: lungary:					
1956-60	2,540.2	3,512.0	2,166.3		937.0
1961-65	3,396.0	2,645.0	1,007.1		926.0
1966-70:	3,916.5	3,236.8	1,324.1		874.8
1975:	4,636.5	3,632.0	1,422.0		838.0
1980	5,178.7	3,945.0	1,515.6		807.0
:					
omania:	1 077 6		006.3		0 701 0
1956-60	1,275.6	4,348.0	296.1		2,791.0
1961-65:	3,567.0	4,981.0	297.0		2,864.0
1966-70:	2,509.4	6,597.0	325.4		2,983.2
1975:	2,496.7	7,638.0	310.5		2,980.0
1980	2,349.0	8,484.0	309.6		2,980.0
ugoslavia:					
1956-60	NA	2,600.0	1,040.4		4,708.0
1961-65	NA	2,602.0	900.0		4,532.0
1966-70	NA	3,166.0	790.2		4,485.4
1975	NA NA	3,759.0	735.3		4,336.0
1980:	NA NA	4,209.0	669.6		4,239.0
:					0
See notes at end of table.					Continued

Table 24--Availability 1/ of roughages in Eastern Europe, averages 1956-60, 1961-65, 1966-70 and projections to 1975 and 1980--Continued

Country and period :	Corn silage and green silage	: Hay	Fodder beets	Potatoes	Permanent pasture
:		<u>1</u> ,000 met	ric tons		1,000 hectares
Total southern countries: :					
1956-60	2/5,511.5	11,941.0	4,021.2		9,212.0
1961-65:	$\frac{1}{2}$ / 9,279.7	12,018.0	2,599.2		9,222.0
1966-70:	2/ 8,916.5	15,231.4	3,176.4		9,456.4
1975:	$\frac{1}{2}$ / 9,749.2	17,569.0	3,371.4		9,264.0
1980	$\frac{2}{10}$,234.4	19,416.0	3,532.5		9,131.0
Total Eastern Europe:					
1956-60:	2/14,884.1	38,237.0	20,804.6	28,633.8	12,276.0
1961-65:	$\frac{1}{2}/23,308.1$	40,634.0	17,994.6	29,953.0	12,310.0
1966-70:	2/25,469.4	51,801.8	22,639.5	34,414.4	12,521.4
1975:	$\frac{1}{2}$ /27,986.9	55,912.0	22,750.3	39,848.0	12,428.0
1980:	$\frac{2}{2}/29,611.1$	66,318.0	22,941.1	43,724.5	12,367.0

^{1/} For hay and permanent pasture, consumption was assumed to equal production. Consumption of feed potatoes was estimated through calculation of a potato balance. For corn silage and green feed, consumption was estimated at 75 percent of production. For fodder beets, consumption was estimated at 90 percent of production.

2/ Excludes Yugoslavia.

Sources: (6, 9, 52, 74).

countries, for a number of years total area has remained just above 12 million hectares. This stability is due to the fact that much permanent pasture is marginal land in mountains and marshes, and as such is unsuitable for efficient production of other crops.

Projections

Roughage consumption projections are derived directly from estimates of future roughage production (see ch. IV, pp. 72-75 and table 42). Hay production is projected to reach 66 million tons in Eastern Europe by 1980, compared with 52 million tons annually during 1966-70. Corn silage and green feed production should reach 39 million tons by 1980, an increase of almost 20 percent over the 1966-70 average. All roughages except permanent pastures are projected to increase from the generally low production levels in 1966-70. The area devoted to permanent pastures is expected to remain fairly constant through 1980 at about 12.4 million hectares, but pasture quality should improve because of increased fertilizer use.

IV. PRODUCTION PATTERNS AND PROJECTIONS

Factors Affecting Agricultural Production

Among the many factors affecting agricultural production, the following are especially important in the context of Eastern Europe: Climate and soils, government policies and programs, marketing, prices and returns, changes in technology, and institutional changes.

Topography, Climate, and Soils

Eastern Europe's topography is quite varied, particularly in the southern countries. Poland and most of East Germany form a part of the vast Northern European Plain, which rises gently towards several mountain chains which stretch along their southern borders. The other five countries are intersected by major mountain chains and thus have a more pronounced relief. In all the countries, agricultural activities are concentrated on plains and river basins. Leading farming areas are the European Plain, covering most of Poland and East Germany; the Pannonian Plain, covering most of Hungary, northern Yugoslavia, and western Romania; the Danubian Plain in southern Romania and northern Bulgaria; the Elbe Plain and the Moravian Basin in northern and central Czechoslovakia; and the Plain of Thrace in southeastern Bulgaria. Other important farming areas are the Moldavian Upland in northern Romania and the Bohemian Plateau in Czechoslovakia. Large parts of the mountainous area in the southern countries are suitable for grazing. The land configuration limits the usable agricultural land (arable and grazing) in Eastern Europe from a low of just over 50 percent of the total area in mountainous Czechoslovakia and Bulgaria to a high of 75 percent in Hungary (table 2).

Soils in the region are generally good but need fertilization. Chernozem and Brumizem soils—with their fine structure and high organic matter content—are particularly important in central East Germany, in a narrow belt of central Poland, and in the Elbe Plain. They predominate in parts of the Pannonian and the Danubian Plains. Grey-brown Podzolic and podzolized soils of medium to coarse texture and varied fertility predominate in the rest of Poland and East Germany and in western Hungary. Mountain Podzolic soils, shallow and litholic, cover much of Czechoslovakia, the southwestern part of East Germany, and Transylvania in Romania. Mountain brown, red Mediterranean, and Rendzina soils with lithols cover much of Yugoslavia and Bulgaria. At higher elevations, mountain soils restrict agriculture to grazing. Equally restrictive in use are the areas of sandy soils, with only a thin layer of humus, found close to the Baltic Sea in Poland and East Germany and in northern Hungary (24).

Eastern Europe lies in a temperate zone of continental climate, with oceanic influences in East Germany, western Poland, and Bohemia in Czechoslovakia, and Mediterranean influences in Yugoslavia, Bulgaria, and southeastern Romania. The lowest average January daily temperature ranges from 25°F in Poland, Moravia and Slovakia in Czechoslovakia, Hungary, Romania, and northeastern Bulgaria to 35°F East Germany, Bohemia, Yugoslavia, and Bulgaria. The highest average daily July temperature is about 65°F in Poland, East Germany, and Czechoslovakia, and 75°F in Hungary, Romania, Bulgaria, and Yugoslavia. The frost-free season is 120 to 180 days long in the northeastern part of the region and 180 to 240 days long in its western and southern part.

Average yearly precipitation in Eastern Europe ranges from 500 to 750 mm. (20-30 in.), about the same as in the Great Plains of the United States. Exceptions are a part of central Poland northeast of Warsaw, and the southeastern part of Hungary; in both areas, precipitation averages 250-500 mm. Also, in high mountain zones, rainfall is over 1,000 mm. In Poland, heaviest rains occur in summer, when they are favorable to root crops but may damage ripening grains or hinder their harvest. In the northern countries, late frosts or lack of sufficient winter snowfall may cause substantial fluctuations in crop yields, as may recurrent summer drought in the southern countries (8).

Soils and climate greatly limit cropping patterns in Eastern Europe. The sandy soil regions of East Germany and Poland, for example, restrict large areas of arable land to rye and potato production. The short growing period in the northern countries, coupled with a pattern of heavy summer rainfall, prevents large scale cultivation of corn and sunflowerseed but favors profitable sugarbeet and rapeseed production. In contrast, corn and sunflower thrive in the southern countries.

Crop yields are heavily influenced by seasonal weather patterns--particularly since Eastern Europe is subject to frequent droughts. The weather effects are well illustrated in a regression analysis for the northern countries which correlates grain yields with weather and fertilizer use. In Poland, for example, the combination of October, April, and June soil moisture best explains the fluctuation of winter wheat and barley yields. April weather variables, whether specified as soil moisture in Poland or as precipitation in East Germany and Czechoslovakia, correlate very closely with yields of small grains. In this case, the statistical relationship is inverse: the higher the precipitation or soil moisture the lower the yield. 12/

In the northern countries, high levels of April precipitation are apparently associated with cool, delayed springs which impair yields, while low levels of precipitation reflect early springs and early crop growth. The point at which grain crops are adversely affected by abnormally low April soil moisture or precipitation, however, is not known.

The normal weather pattern for the region generally is one of heavy June and July rainfall, dry Septembers, light precipitation in the winter months, and heavy February soil moisture resulting principally from snowmelt. Low winter temperature or light snowfall frequently result in grain and rapeseed winterkill.

Government Policies and Programs

Throughout Eastern Europe, official government plans set production goals and gear the economy towards their fulfillment, using administrative and economic measures.

Since the introduction of economic reforms in the mid-1960's, the governments have become less concerned with day-to-day farm operations. Direct interference with local farm plans has been considerably lessened. Collectives submit plans to the government for its information, but state farms still need approval from central authorities for their plans. Government authorities, when summing up plans, can detect deviations from national goals and reconcile production decisions using incentives or disincentives in the form of price changes, bonuses, subsidies, credits, or, if necessary, legislation. Thus, more reliance has been placed on economic than administrative procedures.

The most direct administrative measures had been the compulsory delivery quota assessments for the most important products. This system has gradually been abandoned in every country; the last two countries to abandon it were East Germany in 1969 and Poland at the end of 1971. Prescribed quotas for each commodity left little leeway for flexible local planning. Lower prices for compulsory delivery and higher prices for contract purchases made meaningful calculations of profitability impossible. The combined effect of rigid planning at the top, compulsory deliveries, and fixed pricing systems left few incentives to producers and strongly contributed to the past stagnation of the agricultural sector.

Present contract purchases influence supply by assuring farmers fixed uniform prices, subject to quality differentials. Bonus payments, cash advances, and mixed feed supplies at reduced prices serve as additional incentives for signing the contracts.

^{12/} See app. tables 9 and 10.

The new price and tax structures also allow some profit accumulation. These changes, particularly increased producer prices for grain and livestock products, have gradually enabled socialized farms to finance in large part their own reinvestment schemes and to reduce their reliance on government subsidies and credits. However, government subsidies are still provided to help the socialized farms that are unprofitable and large-scale land improvement projects.

Marketing

Grain, pork, poultry, milk, and eggs that enter trade channels are purchased by agencies of the Central Purchase Administration in Czechoslovakia, the State Grain Industry in East Germany, the Grain Trust in Hungary, and analogous government organizations in the other countries. Production in excess of the contracted quantity can be privately marketed. But prices on private markets generally have recently been not much higher than contract prices. Beef marketing is almost completely government controlled, through state-owned slaughterhouses.

Within the state procurement system, the East European countries are at different stages in the changeover from a system of strict production plans and compulsory delivery at low prices to a more market-oriented delivery system. However, for grain, at least, contracting is the predominant procurement method used in each country. In the contract signed by the farm and the government purchasing agency, the price is fixed. The countries do have variations in their contracting methods, however. In East Germany, Czechoslovakia, and Hungary, the contract is for a specific quantity. In Poland, it is based on a given area of land from which a certain yield is expected.

During 1966-70, government procurement systems handled 22 to 35 percent of total grain production, with the share of purchases being highest in Bulgaria and lowest in Yugoslavia (table 25). Wheat was generally procured at a heavier rate than feedgrain, ranging from 31 percent in Czechoslovakia to 65 percent in Hungary during 1966-70. The procurement rate for wheat and feedgrains steadily increased between 1956-60 and 1966-70. Because of rapidly increasing production, however, the quantity of grain left on the farms also increased. The increase in commercial feed milling could be influencing this trend.

Prices and Returns

Purchase prices for most agricultural commodities and inputs in Eastern Europe are fixed and announced annually. Yugoslavia and Hungary are less rigid than the other countries. Yugoslavia has a free price system, but the Government is obligated to purchase the products if the free market price drops below a Government-guaranteed minimum price. Since the introduction of economic reforms in 1968, Hungary has had a three-tier price system composed of fixed, limited, and free prices. Government purchase prices are fixed. After Government contracts have been met, however, feedgrains, pork, and

Table 25--Total grain and wheat procurements and amount left on farms, Eastern Europe, averages 1956-60, 1961-65, and 1966-70

Country and period :	Government purchases	: Grain left : on farms	: Total : production	: Government: purchases as: % of total: production
_		Millio	on metric tons -	Percent -
:				
Czechoslovakia: :				
Total grain: :	1 6	2 0	5.3	29
1956-60	1.6 1.7	3.8 3.8	5.5	32
1961-65 1966-70	1.9	5.1	7.0	27
1900-70	1.09	7.1	7.0	27
Wheat:				
1956-60	• 4	1.1	1.5	26
1961-65	.6	1.2	1.8	32
1966-70	. 9	2.0	2.9	31
East Germany:				
Total grain: :				
1956-60	2.0	4.1	6.0	32
1961-65:	1.9	3.9	5.8	33
1966-70:	2.2	4.4	6.7	34
Wheat:				
1956-60	.5	.9	1.3	35
1961-65	. 4	.9	1.4	33
1966-70	.7	1.3	1.9	34
:	• ,	1.00	2.77	
Poland:				
Total grain:				
1956-60	2.3	11.7	14.0	16
1961-65	2.4	12.6	15.0	16
1966-70:	4.0	13.0	16.8	24
T 77				
Wheat: :	• 5	1.8	2.3	24
1961-65		2.2	3.0	25
1966-70	.8 1.5	2.7	4.3	36
1900-70	Τ• Ͻ	۷ • ۱	4.0	30
Bulgaria:				
Total grain:				
1956-60	1.2	3.1	4.4	27
1961-65	1.4	3.4	4.7	29
1966-70	2.2	4.1	6.2	35
:				
Wheat: :				
1956-60	. 9	1.3	2.2	40
1961-65:	1.0	1.2	2.2	46
1966-70:	1.6	1.3	2.9	56
:				Continued
				Continued

Table 25--Total grain and wheat procurements and amount left on farms, Eastern Europe, averages 1956-60, 1961-65, and 1966-70--Continued

•		:	0 1 1 5		Government
Country and period :	Government	•	Grain left	: Total	: purchases as
· ·	purchases	:	on farms	: production	: % of total
		:	361111		: production
:-			<u>Millio</u>	on metric tons -	<u>Percent</u>
Hungary:					
Total grains:					
1956-60	1.4		5.1	6.4	21
1961-65	1.5		5.2	6.7	23
1966-70	2.4		5.8	8.1	29
			2.0		
Wheat:					
1956-60	.8		1.0	1.8	46
1961-65	1.2		. 8	2.0	59
1966-70:	1.9		1.0	2.9	65
Romania:					
Total grains: :					0.6
1956-60	2.3		6.8	9.2	26
1961-65	3.8		7.0	10.9	35
1966-70:	NA		NA	NA	NA
Wheat:					
1956-60	1.5		1.8	3.3	44
1961-65	2.1		2.2	4.3	49
1966-70	NA		NA	NA	NA
1900-70	NA		NA	IVA	144
Yugoslavia:					
Total grains:				,	
1956-60	1/ 1.7		10.4	1/12.1	14
1961-65	1.7		8.6	10.3	16
1966-70	2.9		10.0	12.9	22
:					
Wheat:					
1956-60	$\frac{1}{2}$ / 1.1		3.1	1/4.1	26
1961-65	1.0		2.6	3.6	28
1966-70	1.7		2.8	4.5	38
•					

^{1/} 1959 data only.

Sources: $(\underline{6}, \underline{13}, \underline{19}, \underline{52}, \underline{74}, \underline{81})$.

poultry may be sold at free prices on farm markets. The free market competes with the subsidized retail Government stores. Higher prices on farm markets develop during periods of shortages in retail stores.

Producer prices for grains and livestock products in every East European country have shown an upward trend since the early 1960's. The sharpest increases have been in Yugoslavia, where they have been caused by strong inflationary pressures. East European grain prices paid to farmers increased by 30 to 50 percent between 1956-60 and 1966-70 (table 26), creating a price structure relatively favorable to grain production. Czechoslovakia, Hungary, and Poland generally increased grain prices faster during 1966-70 than during the earlier 5-year period. Czechoslovakia reversed a downward price trend, and Hungary and Poland took price action to slow the decline in grain area during 1966-70.

In the livestock sector, the governments have shifted prices of the different types of meat to influence production in line with priorities. It remains to be seen how the recent stagnation of poultry prices and higher beef prices will retard poultry production or promote beef production. In the past, relatively higher poultry prices were responsible for the fast development of the poultry industry. However, the production increases achieved in poultry cannot be duplicated as easily in the cattle industry, mainly because of the longer reproductive cycle of cattle.

Although the East European countries are currently stressing increased livestock production, it is difficult to measure returns to livestock raising in the region because of incomplete data and price structures which are not necessarily based on production costs. However, since feed obviously takes up the largest share of total costs, a good measure to use to approximate profitability of livestock production is the livestock/feed price ratio.

The livestock product/grain price ratio varied considerably from year to year between 1956 and 1970 (table 27). Poland had the lowest ratio during the period and East Germany the highest—higher even than that of the United States. 13/ Except in Poland, the ratio in each country is higher than the ratio in France, Italy, and Germany. The high price ratio in East Germany may partially explain why East German beef, veal, and milk production had the highest growth rate among the East European countries. On the other hand, high hog/barley and poultry meat/barley price ratios in East Germany have apparently had no marked effect on production. The low price ratio in Poland was caused by including low compulsory meat delivery prices in the averages.

Besides being influenced by the product/grain price ratio, production is influenced by the relative profitability of the livestock products. For example, faster increases in slaughter cattle prices in recent years were permitted to make cattle more competitive for feeding than they had been. Also, the choice between beef and milk production depends on the price ratio for these products. Relatively sharp increases in cattle prices may cause

 $[\]frac{13}{\text{In }1965-69}$, the average U.S. ratio was 10 for wheat, 11 for corn, and 12 for sorghum grain (40, p. 80).

Table 26--Grain price indexes, using current prices, Eastern Europe and selected West European countries, averages 1961-65 and 1966-70

(1956-60 = 100)Wheat Rye Corn Country 1961-65 : 1966-70 : 1961-65 : 1966-70 : 1961-65 : 1966-70 : Czechoslovakia....: 116 145 130 139 133 170 East Germany....: 126 138 132 150 NA NA 140 Poland....: 110 108 153 NA NA Bulgaria....: NA NA NA NA NANA Hungary....: 108 130 113 135 100 NA Yugoslavia 1/....: 173 294 NA NA 165 248 France....: 114 126 121 140 109 111 114 114 Italy....: 102 98 108 125 West Germany....: 102 97 101 96 NA NA

Sources: (5, 6, 13, 19, 52, 74, 81).

^{1/} Current prices adjusted to include 1961 and 1965 devaluations of the dinar. Prices adjusted by cost of living index.

Table 27--Livestock product/grain producer price ratios in basicin burupe and selected here are averages 1956-60, 1961-65, and 1966-70 1/

West Germany	5.0	NA NA NA	6.3	NA NA NA	NA NA NA	NA NA NA	0.9	Continued
Italy	NA NA NA	7.5 8.0 6/6.4	NA NA NA	6/7/9	NA NA NA	NA NA NA	NA NA NA	CO
France :	NA NA NA	4.7 6.8 6/8.1	NA NA NA	6/8.1	NA NA NA	NA NA NA	NA NA NA	
Yugo- slavia	4.1 5.1 7.0	4.08	47	7.00	000 000	7.7	6.11	
Hungary	3/4.3 4/6.5 8.4	8/6.2 7.0 8.8	3/8.4	8/8/ 9.0 9.5	8/8.6 4/10.2 10.0	7/10.1 11.3 10.6	3/1.1	
: Bulgaria :	2/6.4 4.8 5/8.6	2/5.2 6.9 5/8.5	2/8.9 9.1 5/8.6	2/7.3 7.5 \text{\tin}\exiting{\text{\texit{\text{\text{\text{\text{\tin}}\tint{\text{\text{\text{\texi{\text{\text{\text{\text{\text{\text{\tin}\text{\text{\text{\tin}\tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\ti}\text{\tex{\tex	2/9.0 12.8 10.8	NA NA NA	$\frac{2}{1.9}$	
: Poland :	4.8	NA NA NA	8.7.7 47 3.3	NA NA NA	10.8	NA NA NA	1 6.8.	
East Germany	8.5 8.0 10.7	NA NA NA	12.7	NA NA NA	18.7 14.4 14.9	NA NA NA	111 00.0	
Czecho- slovakia	6.1 7.0 7.5	7/8.5	4.80	5/10.7 9.3 8.1	NA NA NA	NA NA NA	1.4.1.1.4.	
Item	Beef/barley: 1956-60	Beef/corn: 1956-60	Pork/barley: 1956-60	Pork/corn: 1956-60. 1961-65.	Poultry meat/barley: 1956-60	Poultry meat/corn: 1956-60	Milk/barley: 1956-60	See notes at end of table.

Table 27--Livestock product/grain producer price ratios in Eastern Europe and selected West European countries, averages 1956-60, 1961-65, and $1966-70 \, \underline{1/-}$ -Continued

czecho- slovakia g slovakia g zlovakia g zlovakia	ast : Poland : Bulgaria : Hungary : Yugo- : France : Italy : Germany : Slavia :	NA NA $\frac{2}{1.6}$ $\frac{8}{1.6}$ $\frac{8}{1.2}$ $\frac{8}{1.0}$ $\frac{8}{1.8}$ $\frac{8}{1.0}$ NA NA $\frac{1.6}{1.6}$ $\frac{1.2}{1.6}$ $\frac{8}{1.2}$ $\frac{8}{1.2}$ NA NA $\frac{5}{1.8}$ $\frac{1.7}{1.6}$ $\frac{6}{1.0}$ $\frac{6}{1.2}$ NA	1.1 .7 $\frac{2}{7}$.7 .4 NA NA .5 .9 .6 .9 .7 $\frac{4}{7}$.6 .4 NA NA .5 .9 .5 .5 .6 .5 NA NA $\frac{6}{5}$.5 .9 .9 .9 .9 .9 .5 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9	NA NA .6 $8/.6$.4 .4 .6 NA NA NA NA NA .6 .5 .5 .4 .6 NA	rices are average government procurement prices in Eastern Europe and averurope. Romania has been excluded because of insufficient data.
Milk/corn: 1956-60. 1961-65. 1966-70. 1956-60. 1956-60. 1956-60. 1956-60. 1966-70. Eggs/corn: 1956-60. 1966-70. 2/1966-70. 2/1966-70. 2/1966-60 average. 5/1966-60 average. 5/1966-60 average.	echo- East vakia Germany				all prices tern Europe.
	co.	Milk/corn: 1956-60	Eggs/barley: 1956-60	Eggs/corn: 1956-60	1/ Animal products in live weigage price received by farmers in 2/ 1960 only. 3/ 1957 and 1960 only. 4/ 1963-65 average. 5/ 1966-69 average. 7/ 1058 60 average.

Source:

excess slaughter; unduly increased milk prices may induce excessive slaughtering of young calves (20). It is evident that all the East European governments are testing prices and price relationships in an attempt to balance production toward fulfilling their central plans.

Fragmentary information indicates that beef and milk production has been unprofitable compared with hog fattening and poultry production (53, 79, 85). This is highlighted in a Hungarian study that shows profitability of various livestock activities in 1969:

	Production value	Gross expenses	Net income
		Forints	
Milk production	11,604	14,519	-2,917
Calf feeding	6,053	8,610	-2,557
Cattle fattening	8,569	10,866	-2,297
Hog breeding	4,853	8,342	-3,489
Hog fattening	3,584	3,266	318
Wool production	666	724	-58
Egg production	304	247	57
Broiler production	148	110	38

Source: (85).

Livestock price increases in Eastern Europe since the late 1960's have remedied the discrepancies among individual products, but the higher rate of price increases for cattle breeding and fattening did not bear its fruits immediately because of cattle's longer reproduction cycle. In Hungary, where the problem of increasing beef and milk production is more acute than in the other six countries, the Government has tried several other measures as well—such as making bonus payments for every heifer raised, granting loans for increased herds, and restricting cow slaughter since January 1972.

In any country, profitability of livestock raising is further enhanced by increasing the scale of production. Until recently, lack of capital restricted the expansion of large-scale production in Eastern Europe, but investment priorities have now been shifted to this direction.

Changes in Technology

Many different changes in technology affect agricultural land, output, and labor productivity. The most significant changes in Eastern Europe have been mechanization, rapidly increased fertilizer use, introduction of new plant varieties and animal breeds, and better soil management.

Mechanization. The late 1950's and early 1960's were years of rapid mechanization in East European agriculture. During this period, the level of mechanization in the region's more industrialized countries was brought up to that of the developed Western countries. Between 1956-60 and 1966-70,

total tractor numbers—in terms of 15-horsepower units—tripled, and combine numbers nearly quadrupled. Except in Poland and Romania, most of the growth occurred between 1956-60 and 1961-65 (table 28).

During 1966-70, Czechoslovakia and East Germany had an average of one 15-horsepower tractor for every 27 hectares of arable land (table 29), a ratio well ahead of the other Eastern European countries and close to the U.S. level. The land combine ratio was more uniform in the region, except in Poland and Yugoslavia. In East Germany, where mechanization has progressed the fastest, 99 percent of grain, 77 percent of potatoes, and 91 percent of the sugarbeets were mechanically harvested in 1970 (34).

These countries, however, have had maintenance problems, leading to inefficient use of the available machinery. Inferior quality of the equipment inadequate supplies of spare parts, and excessive diversification of prototypes have exacerbated the problem. In East Germany, for example, where 550 different types of tractors and heavy machinery are in operation, the job of stocking the required 60,000 different spare parts and repairing equipment is difficult at best (3, 4/14/67).

Mechanization has also been introduced increasingly in crop handling and livestock activities. Labor-saving devices for feeding and processing in Czechoslovakia and East Germany have reduced the impact of agricultural labor shortages. Mechanization in East Germany has reduced manpower requirements in pork production from 80-100 hours per ton liveweight in 1960 to 30-50 hours in 1970. In East Germany's milk production, they have been reduced from 70-80 hours to 45-50 hours (33).

Poland and Yugoslavia have the least mechanized agriculture in the region. These two countries continue to rely on horses for draught power. Since the land tenure system of both countries is one of small, privately owned farms, ownership of large pieces of machinery is rare; however, farmers are encouraged to use facilities of machine cooperatives ("agricultural circles" in Poland), which are state subsidized.

Tractors, combines, and other farm machinery in Eastern Europe are generally owned by the state and collective farms. The machine tractor station system, which was an integral part of the East European agricultural mechanization program until the early 1960's, has been discontinued.

During the current 5-year plan period, in the countries where mechanization has progressed the farthest, the next stage of development will be in machinery replacement rather than in numerical increases. Emphasis will be on introducing more technically advanced equipment. Machinery production and supply will be streamlined to halt the proliferation of prototypes.

Use of airplanes for spraying and seeding, which grew rapidly during the late 1960's, will reach commercial proportions in the 1970's.

In Poland and Yugoslavia, the replacement of draught power and manpower by machinery will probably be very slow. In Eastern Europe as a whole, however, increased machanization is generally leading toward reduced animal

Table 28--Tractor and grain combine inventories in Eastern Europe, averages 1956-60, 1961-65, and 1966-70

· · · · · · · · · · · · · · · · · · ·		•	p 8	: Annual rate	e of growth
Country	1956-60	1961-65	1966-70	1956-60 to 1961-65	: 1961-65 to : 1966-70
:		15 h.p. unit	CS_	Per	cent
Tractors: : Czechoslovakia: East Germany: Poland: Total northern : countries:	65.9 1/60.1 71.1	151.7 137.1 116.5	200.6 2/179.3 210.4 590.3	18.1 17.9 10.4	5.7 5.5 12.5
Bulgaria: Hungary: Romania: Yugoslavia 3/: Total southern	30.8 33.0 .46.5 25.8	55.1 72.2 103.5 42.5	83.1 102.4 166.8 55.3	12.3 16.9 17.3 10.4	8.4 7.1 10.0 5.4
countries: : Total Eastern Europe:	136.1	273.3 678.6	407.6 997.9	15.0 15.3	8.3
:	223.2	Number	991.9		cent
Combines: : Czechoslovakia: East Germany: Poland: Total northern : countries:	5,118 4,443 <u>1</u> /3,345	10,268 12,530 <u>1</u> /3,914 26,712	14,561 17,695 <u>1</u> /8,628 40,884	14.9 23.0 3.2 15.7	7.3 7.1 15.3
Bulgaria: Hungary: Romania: Yugoslavia: Total southern countries:	4,875 <u>4</u> /2,776 8,805 2,147 18,603	7,484 6,823 31,314 9,260 54,881	8,700 10,574 44,392 12,106	8.9 19.7 28.9 33.9	3.0 9.0 7.1 5.5
: Total Eastern Europe:	31,509	81,593	116,656	21.0	7.4

 $[\]frac{1}{2}$ / State farms and machine stations only. $\frac{2}{2}$ / 1966-68 average.

Sources: $(\underline{6}, \underline{13}, \underline{19}, \underline{37}, \underline{52}, \underline{74}, \underline{81})$.

 $[\]frac{3}{4}$ Physical numbers. $\frac{1}{4}$ 1959 not included.

draught power, more timely and deeper soil cultivation, faster harvesting, and reduced harvesting losses.

A program for the coordination of farm machinery manufacturing and distribution within the CEMA 14/ countries is in the preparatory stage.

Fertilizer use. Except in East Germany and Czechoslovakia, fertilizer use 15/ in Eastern Europe is low compared with levels in advanced West European countries (table 30). Increased application of fertilizer is seen by the region's planners as a key measure for increasing agricultural productivity. Total fertilizer use in Eastern Europe has increased almost continuously over 5-year periods, from the 1.6-million-ton annual average during 1956-60 to the 5.4 million tons during 1966-70 (table 31). Even though fertilizer applications have grown more rapidly in the southern countries, the northern countries on a smaller arable area use 58 percent of the total. Because of the development of ammonia fertilizer technology in Eastern Europe, nitrogen--constituting 40 percent of the availability--is the leading component. Phosphate and potash account for 29 and 30 percent, respectively. Potash is applied more widely in the north because of the soil and climate there and the larger domestic production in East Germany.

A close relationship between expanded fertilizer use increasing yields of most grains in Eastern Europe is evident from statistical analysis, based on historical data, although data on the quantities of fertilizer actually applied to grain in the region are not available. The relationship is also evident from comparisons of yields and fertilizer used in some of the more advanced West European countries (table 32).

According to ratios of average fertilizer prices paid by farmers to average prices received for selected grains, increased fertilizer use is particularly profitable in Czechoslovakia and Yugoslavia. East European countries generally have a favorable grain fertilizer price ratio compared with France, Italy, and West Germany (table 33).

Except in East Germany and Czechoslovakia, it was only during the 1960's that fertilizer production in the East European countries was sufficient and the pressure for increasing grain yields strong enough to encourage widespread application of fertilizer on grain. As minimal fertilizer needs have been met, the governments have encouraged fertilizer use by granting subsidies to farmers. The Czechoslovak Government pays farm supply organizations 117 crowns (\$7.20) per 100 kilograms of active substance for ammonium nitrate, and 120 crowns (\$7.40) for simple superphosphate. The Hungarian Government paysubsidies to fertilizer manufacturers in the form of grants: for ammonium nitrate, 189 forints per 100 kilograms of active substance (\$6.31); for simple superphosphate, 303 forints (\$10.10); and for muriate of potash, 124 forints (\$4.12).

^{14/} Council for Mutual Economic Assistance, discussed on p. 91.

15/ Fertilizer data in this report are in terms of nutrient content (NPK) unless otherwise specified.

Table 29--Arable land per tractor 1/ and grain area per combine, Eastern Europe, averages 1956-60, 1961-65, and 1966-70

Period	Czecho- slovakia	East Germany	: : Poland :	Bulgaria	: : Hungary :	: : Romania :	Yugo- slavia
	:		Arable lan	d per trac	torhecta	res	
1956–60 1961–65 1966–70	: 36	86 36 27	228 137 73	148 83 55	174 78 55	220 101 63	322 196 149
	:		Grain area	per combi	nehectar	es	
1956-60 1961-65 1966-70	: 241	550 181 131	2,803 2,221 980	543 321 255	1,288 466 292	830 216 147	2,570 579 424

^{1/} In 15-horsepower units, except for physical numbers in Yugoslavia.

Sources: (6, 13, 19, 37, 52, 74, 81).

Table 30--Fertilizer use on arable land in Eastern Europe, averages 1956-60, 1961-65, and 1966-70

:	;		:	: Annual gr	owth rates
Country	1956-60	1961-65	1966-70	1956-60 to 1961-65	
	Kil	ograms/hect	are	Per	cent
Czechoslovakia: East Germany 1/	80 176 40	115 217	191 293 120	7.6 4.2 8.2	10.7
Poland Total northern countries:	74	59 91	168	4.3	15.2 13.1
Bulgaria: Hungary:	2 ¹ 4	49 53	146	15.3 21.5 26.2	24.4
Romania	5 24 16	16 47 37	46 68 80	14.4 18.2	23.6 7.7 16.7
Total Eastern Europe:	24 24	67	121	8.7	12.5
France	90.8 51 245	130.7 60 302	2/184.3 2/78 2/350	7.6 3.2 4.2	7.1 5.2 3.2

^{1/} Split-year average. 2/ 4-year average.

Sources: (6, 13, 19, 37, 42, 43, 52, 74, 81, 84).

Table 31--Fertilizer consumption in East European agriculture, averages 1956-60, 1961-65, and 1966-70, and industrial fertilizer production, average 1966-70

Fertilizer and period	Czecho- slovakia	East Germany	Poland	Northern	Bulgari	: a:Hungary:Romani :	: omania:	Yugo- slavia	Southern	Total
	•		Consu	onsumption in ag	agriculturel	000,	metric to	tons		
Nitrogen: 1956-60	109.6 170.4 309.0	43.6 59.8 95.0	207 326 610	360.2 556.2 1,014.0	74.2 121.0 352.2	1/65.3 142.6 291.0	18.6 81.8 302.6	72.4 145.6 250.5	230.5 491.0 1,196.3	590.7 1,047.2 2,210.3
Phosphate: 1956-60	120.8 200.2 280.8	36.9 50.8 73.3	160 258 468	317.7 509.0 822.1	35.0 93.4 272.4	1/54.9 99.6 169.4	30.9 74.6 151.6	69.7 122.8 169.3	190.5 390.4 762.7	508.2 899.4 1,584.8
Potash: 1956-60	203.8 253.2 433.4	95.5 106.5 124.4	271 356 773	570.3 715.7 1,330.8	26.0	1/28.0 55.6 149.0	100.5	70.1 121.0 137.1	104.6 195.7 331.5	674.9 911.4 1,662.3
Total NPK: 1956-60	434.2 623.8 1,023.2	175.9 217.1 292.7	638 940 1,851	1,248.1 1,780.9 3,156.9	111.8 223.0 651.4	1/115 298 609	53.6 167.0 472.8	212.2 389.5 556.9	492.4 1,077.5 2,290.1	1,740.5 2,858.4 5,457.0
Lime: 1956-60	NA	147.8 196.0 275.8	288 580 1,505		NA	NA	NA	NA		
	• ••		Indus	Industrial produ	production1.	,000 metri	c tons			
1966-70 average: Nitrogen Phosphate Potash	275.8 282.0 557.8	360.0 335.4 2,221.0 2,916.4	701.8 469.0 1,170.8	1,337.6 1,086.4 2,221.0 4,645.0	273.6 121.8 395.8	249.4 155.4 404.8	398.2 193.4 591.6	137.4	1,058.8 639.2	1,760.6 1,725.6 2,221.0 6,343.2
1/ 1958-60 average.										

Sources: (6, 13, 19, 52, 74, 81).

Sources: (6, 13, 19, 52, 74, 81). Table 32--Fertilizer application rates per nectare of arable lana and grain yields, Eastern Europe and Selected West European countries, average 1966-70

	Czecho- East slovakia Germany	Poland	Poland :Bulgaria:	Hungary	: Romania	Yugo- slavia	France	Italy	West
			Ki	Kilograms/hectare	ectare				
58 81 191	95 73 124 293	120 120	77 60 6 143	51 30 27 109	23 17 7 7	30 20 17 67	57 75 184	34 32 12 78	113 100 137 350
			01	Juintals/hectare	ectare				
288.9 33.9	36.5 32.4 NA	23.2 23.0 NA	27.4 24.4 29.3	23.6 21.1 31.5	16.9 19.2 22.3	23.2 16.2 30.1	34.3 31.3 46.7	22.9 15.8 41.3	38.9 34.6 48.9

Sources: $(\underline{6}, \underline{13}, \underline{19}, \underline{23}, \underline{52}, \underline{74}, \underline{81})$.

Table 33--Selected fertilizer/grains price ratios in Eastern Europe and selected West European countries, average $1966-70~\underline{1}/$

Grain and fertilizer	Czecho- slovakia	Poland	Bulgaria <u>2</u> /	Hungary $\frac{3}{4}/\frac{4}{4}$	Yugo- slavia	France	Italy	. West Germany
Wheat/ammonium nitrate	0.55	0.43	1	0.45	0.40	0.35	0.45	0.37
Barley/ammonium nitrate:	.53	. 39	0.34	.36	. 36	1	1	. 33
Corn/ammonium nitrate	.50	1	.34	.34	.28	. 33	.38	1
••								
Wheat/superphosphate	t9.	. 60	1	09.	94.	. 37	09.	7.42
Barley/superphosphate	.62	.54	. 37	. 48	04.	1	1	.37
Corn/superphosphate	.59	1	.36	94.	.32	. 35.	.50	1
••								
Wheat/muriate of potash	1.91	1.59	1	1.86	1	96.	76./4	1.21
Barley/muriate of potash	1,84	7,44	. 88	1.48	1	1	1	1.09
Corn/muriate of potash	1.75	1	. 86	1.40	1	06.	. 80	1

 $\frac{1}{2}$ Ratio between prices paid to farmers for wheat, barley, and corn and prices paid by farmers per 100 kgs. of plant nutrients. No data available for East Germany and Romania.

 $\frac{2}{1968}$ grain prices. $\frac{3}{4}$ State procurement prices for grains. $\frac{1}{4}$ Subsidies not included.

Sources: (6, 13, 19, 23, 52, 74, 81).

While subsidy programs and favorable retail prices have encouraged in-:eased fertilizer use in the region, the efficacy of these measures has been !minished by distribution problems.

Present plans call for a drastic increase in fertilizer use. The most apid increase is slated for Romania, where the goal is to triple the 1970 oplication rate by 1975 (7). East Germany will continue to build regional gro-chemical centers to improve fertilizer use. Their purpose is to entralize distribution and storing and to provide a means of scientific ontrol of application of fertilizers. By 1975, 344 centers are to be in peration (3, 3/26/72). All the countries of the region are increasing neir manufacture and application of compound fertilizers—a major technological improvement (26). Urea, liquid nitrogen, and slow acting nitrogenous ertilizers are also coming into use.

New plant varieties. The introduction of high-yielding grain varieties as probably the single most influential factor in the rapid boost in grain ields in the late 1960's. The high-yielding Soviet Hard Winter wheats ironovskaya-808 and Bezostaya-I were introduced into the region during 966-70. By 1969, Mironovskaya-808 was being cultivated on 61 percent of the Czechoslovak socialized area in wheat and 50 percent of the total East erman wheat area, and Bezostaya-I was on 85 percent of the Bulgarian wheat rea. An example of the success of these varieties is that the Czechoslovak inister of Agriculture and Food attributed an increased production of 280,000 ons of wheat to these varieties in Czechoslovakia alone.

Mironovskaya-808 is best adapted to the northern countries. This tall-temmed variety has medium resistance to lodging, has a relatively short egetation period, and is winter hardy. It is, however, rather specific noits requirements. In East Germany, for example, it must be planted during ne first 10 days of October, must be seeded at a heavy rate (260-300 kilograms or hectare), must have heavy nitrogen applications (120-160 kilograms of itrogen per hectare)—once at the spring sprouting stage and once at the eading stage—and must have CCC (chlor-cholin-chlorid) applied during the our— or five-leaf stage to strengthen the straw.

Bezostaya-I, which is better suited to the region's southern countries, short stemmed and resistant to lodging and has a relatively short egetation period.

The East European countries are introducing other high-yielding Soviet neat varieties, such as Kavkaz and Aurora, as well as the recently developed exican and Indian dwarf varieties, to avoid over-dependence on one seed ariety. Experimental stations in the region also continue to develop new igh-yielding varieties of wheat and other grains which are specifically uited to Eastern Europe's crop conditions. Other high-yielding wheats, such the Italian variety Libelula, have also come into wide use.

Similiarly important developments have occurred in corn production, as ne southern countries have switched to hybrid varieties. A number of the 2W varieties have been developed by crossing the best foreign and domestic

strains to increase productivity and resistance to disease and lodging. Yugoslavia, for example, developed NS-SK-70 and NS-655, and by 1969, had 56 percent of its corn area planted in these and other hybrid seeds.

In addition to planting domestic corn varieties during 1966-70, Eastern European farmers made wide use of the Soviet Zempole and Krasnodarski and the U.S. Wisconsin and Kansas varieties.

East European farmers also switched to higher yielding varieties of barley, oats, and rye.

The CEMA Permanent Commission on Agriculture's program for seed improvement and exchange has aided the dissemination of new varieties among the participating countries. Under the commission's auspices, increased joint research on seed improvement is planned $(\underline{63})$.

Improved livestock breeds. In the livestock sector, improved breeds, together with new feeding techniques and modern shelters, have been important since the early 1960's in upgrading stocks and substantially increasing livestock production. Yields have improved through higher dressing rates from liveweight to meat, higher farrowing rates of pigs, and transition from fat to lean type animals, a higher percentage of weaned pigs, and, for all stock, higher daily gains. For example, in Czechoslovakia, annual average weanings per sow increased from about 10 in 1963 to more than 15 in 1968-70 (70, 85). For Eastern Europe as a whole, the ratio of livestock products to January live animal inventories rose as follows:

	1956-60	1961-65	1966-70
		Kgs. per ani	ma1
Beef/cattle Pork/hog Milk/cow	77 104 1,808	90 104 1,9 1 2	107 114 2,223

Source: Tables 37 and 38.

While the earlier improved animal breeds originated mostly in the Soviet Union, new breeds are being brought from West European countries.

<u>Irrigation</u>. The southern countries of Eastern Europe have large arid regions, and all of the region is susceptible to frequent drought, making irrigation often indispensable.

In 1970, about 3 million hectates were irrigated in Eastern Europe, mostlin the southern countries. Bulgaria, with one third of the region's total irrigated land, had 16.4 percent of its agricultural land under irrigation. The Romanian, East German, and Czechoslovak systems grew the most rapidly between 1956-60 and 1966-70. One-third of the irrigated land on Bulgarian collective farms was devoted to grain cultivation during 1966-70, about the same portion as on all irrigated farms in Romania.

The crop response to irrigation in Eastern Europe is partially illustrative and a comparison between yields of irrigated crops and overall yields in Egaria. Irrigated wheat yields were 3.6 tons per hectare versus 2.5 tons erall in 1969; barley yields were 2.6 tons versus 2.2 tons; and corn elds, 5.1 tons versus 4.1 tons.

East European 1971-75 plans call for rapid development of irrigation as means of increasing productive capacity. Planned increases in irrigated are as follows:

	1970	1975 plan
	1,000 hec	ctares
Czechoslovakia	260	305
East Germany	350	650
Poland	1/410	500
Bulgaria	1,001	1,200
Hungary	2/109	NA
Romania	729	2,100
Yugoslavia	130	340
Total	2,989	NA

^{1/ 1968} data.

Sources: (6, 13, 19, 52, 59, 74, 77, 83).

Romania has the most ambitious irrigation development plan of the region, bying given irrigation and land reclamation priority in its current 5-year articultural investment program.

Other measures. While most of Eastern Europe's irrigation projects are stered in the southern countries, adequate drainage is of more concern in a northern countries.

By 1970, more than 4 million hectares in Czechoslovakia, East Germany, at Poland were in soil drainage programs. And the 5-year plans of these cuntries call for additional drainage. Czechoslovakia, for example, plans t drain an additional 300,000 hectares (86), bringing its drained area up t 1 million hectares by 1975.

Liming is also practiced more in the north than in the south, and is a neessary step for maintaining yields on the more acid soils. It is also rquired to neutralize acidic fertilizer residues. In 1969, Polish farmers aplied 112 kilograms of lime per hectares of arable land and East German fromers, 249 kilograms (2). Liming will remain a basic soil management tchnique of the northern countries.

Herbicides and pesticides are coming into use but are employed on a small sale compared with levels in the advanced countries of Western Europe. Explicitly and pesticide applications are expected to rise rapidly during the 170's, particularly in the northern countries.

^{2/ 1966-70} average was 213,000 hectares of irrigated land.

Institutional Factors

Institutional changes in Eastern Europe since the mid-1960's have generally been favorable to agriculture. Agricultural education has become more widespread on several levels, with increased numbers of university graduates managing the large-scale farms. In the livestock sector, more stringent sanitary requirements and improved veterinary services have helped control disease and reduce the mortality rate of young animals. Government encouragement of large-scale feedlots for cattle and hogs and specialized egg production has led to more efficient production. Particularly in East Germany and Bulgaria, cooperation among collective farms and between collective and state farms has been encouraged. East Germany has several joint agricultural enterprises for milk production, raising of young cattle, hog raising and fattening and broiler and egg production (38). In Bulgaria, agricultural complexes have been created for specialized production.

Vertical integration of farm production and processing developed most in the late 1960's in Bulgaria, Hungary, Romania, and Yugoslavia. This combination of activities eliminates waste of perishable products, allows processing wastes to be used as fertilizer, employs seasonally idle agricultural labor, and allows diffusion of technical skills in the countryside (97).

Government-sponsored research is providing the region's farmers with new knowledge and technology. Also the governments are engaged in foreign market promotions and in the pursuit of long-term agreements and new markets for surplus production. Institutions like the recently created Yugoslav "Fund to Improve Production and Marketing of Livestock and Livestock Products" are helping production, marketing, and exports (32).

One adverse development that seems to be affecting East European agriculture even more than West European is the aging of the agricultural population. City life and higher wages in industry attract the younger generation, causing an increase in average age of farmers. A constant replacement of labor with capital equipment on the farms cannot altogether eliminate negative effects of this trend. Also, the motivation of the people may be changing. Collective farm members or state farm employees, with incomes close to those of industria workers, are not apt to put extra efforts into spare-time field activities on their household plots.

Production Patterns

Livestock

To accommodate growing consumer needs as well as export demand for livestock products, East European countries have made improvement in livestock production the primary goal of their current 5-year plans. Because much of th livestock is in the hands of the private sector, past government efforts in this direction have been difficult. Even in the countries with predominately socialized agriculture, the adividual livestock producer is as important as the large-scale socialized lits. About half of all livestock are privately owned in Hungary and Romania, bout one-third in Bulgaria, one-fourth in East Germany, and one-fifth in zechoslovakia. In Poland and Yugoslavia, about 80 percent of livestock expressed in animal units) 16/ are raised on private farms. In the region a whole, almost 80 percent of poultry are privately held, but only about percent of sheep (88).

In addition to private land owners, members of collective farms, state arms, and other workers have been permitted to hold privately a limited termber of livestock. In the past few years, limitations on numbers have been inglifted in Hungary and less strictly enforced in some other countries.

aveungary's elimination of control helped the country achieve record hog umbers during 1971.

The livestock industry is more intensive in the northern than in the abuthern countries. The north has more livestock per hectares of arable land, pre livestock per capita, and greater meat production per animal unit. In onetheless, these countries import more meat than the southern countries acause of higher incomes and therefore higher per capita consumption.

In Eastern Europe, pork accounts for over one-half of total meat production, beef and veal one-third, poultry less than 10 percent, and mutton about percent. Of total mutton production, 80 percent comes from the southern puntries (primarily Bulgaria and Romania). Except in Poland and Yugoslavia, lich account for 73 percent of the region's horse numbers, horses as draught ower have been replaced to a large extent by tractors and trucks.

Cattle raising remains a dual-purpose industry throughout Eastern Europe, though a confined feeding operation for "baby beef" is emerging in ugoslavia, based on Simmenthal and Holstein calves rather than on purely eef-type animals.

Less than half of the total cattle herd are cows. Country planning that the cattle herds believe this proportion is insufficient for sustaining growth in the cattle herds. Various measures are being used to revitalize the cattle ector, ranging from price incentives to tax rebates. Beginning in 1972, ungary even restricted the slaughter of cows.

Lean-meat type hogs predominate in the northern countries, where the ivestock industry is more advanced. Fat-type hogs predominate in the outhern countries, but a changeover to lean-meat types is underway there. og production is subject to cyclical and seasonal fluctuations of over-roduction or underproduction. Elimination of these fluctuations is of high riority in the region.

A change in emphasis is also occurring in the sheep raising industry—from ool to meat production—as the importance of artifical fibers increases. The ize of sheep herds depends on the availability of pastures that are unsuitable or cattle because of mountainous terrain or the quality of grass.

^{16/} Horse = 1, cattle = 0.8, hog = 0.12, sheep = 0.1, poultry = 0.04 (88).

On private holdings, poultry are fed harvest residues in the fields, farm wastes, and some additional grain. In modern factory type operations, use of scientific feeding norms and better breeds has increased feeding efficiency. The poultry sector has become the most dynamic agricultural growth sector. However, the current slowdown in foreign demand for broilers and eggs may dampen further growth prospects. Experiments are in progress in the production and export of ducks, geese, turkeys, and specialty items such as goose liver, to regain some ground lost in the export market for broilers.

Grains

Since the 1950's over half of the arable land in Eastern Europe has beer sown to grain (table 34). In Romania and Yugoslavia, despite a declining trend over 1956-70, grain's share remained above 60 percent even during 1966-70. The lowest share for those 5 years was in Czechoslovakia, East Germany, and Bulgaria--less than 50 percent.

During 1966-70, wheat occupied about one-third of the total grain area. Bulgaria had the highest share--almost half of total grain area--and Poland had the lowest--about one-fifth (table 35).

Wheat is the principal grain in Eastern Europe, followed by rye in the northern countries and corn in the southern countries. Wheat and rye are sown in the fall, except for a small area sown in spring in the northern countries. Barley is sown in both fall and spring, but malt barley is entirely spring-sown. Oats, corn, rice, and other grains are sown in the spring. Rice is relatively unimportant and is cultivated only in the souther countries. Total rice area in the region during 1956-70 varied from 150,000 to 200,000 hectares.

Oilseeds and Roughages 17/

Oilseeds and roughages are a vital part of the East European livestock feeding program. Adequate production of these feedstuffs is as indispensable for intensive development of the livestock sector as increased grain production. Their importance is illustrated by feeding patterns in Poland, where nongrain feeds accounted for about 80 percent of the carbohydrates and proteir fed to livestock in the 1966/67 crop year. 18/ The region has to import some oilseed meal. For other nongrain feeds, the countries generally depend on their domestic capabilities.

Sunflowerseed and rapeseed are the primary East European <u>oilseeds</u> used in manufacturing protein meal. The two crops are cultivated on 2 percent of the agricultural land. Rapeseed is the dominant oilseed in the northern countries

^{17/} Roughages are corn silage, hay, fodder beets, potatoes, pastures, sunflowerseed, and rapeseed.

^{18/-} From (52), table 21. Carbohydrates expressed in terms of oat units.

Table 34--Grain area as share of total arable land in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980

Country	1956-60	1961-65	1966-70	1975	1980
			Percent		
Czechoslovakia: East Germany: Poland: Total northern countries:	47.6 47.5 57.8 53.8	45.7 45.4 54.6 51.0	48.2 47.5 55.0 52.2	50.2 50.4 56.0 53.7	49.7 52.5 56.6 54.3
Bulgaria. : Hungary. : Romania. : Yugoslavia. : Total southern countries. :	58.0 62.2 71.6 66.4 66.0	52.6 56.5 64.7 64.2 61.1	48.9 55.0 62.0 62.2 58.6	48.9 53.8 57.3 59.4 56.7	48.9 52.5 54.4 57.6 54.3
: Total Eastern Europe:	60.1	56.3	55.6	55.3	54.3

Source: App. table 9.

Table 35--Wheat area as share of total grain area in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980

Country	1956-60	1961-65	1966-70	1975	1980
:					
:			Percent		
:					
Czechoslovakia:	27.7	29.9	38.4	42.8	44.5
East Germany:	17.2	19.0	23.5	28.7	32.4
Poland:	15.3	17.4	21.7	27.3	31.3
Total northern countries:	17.8	20.0	25.2	30.6	34.0
:					
Bulgaria:	52.0	50.7	47.9	45.1	43.1
Hungary	33.5	33.2	38.8	32.4	30.3
Romania:	40.1	43.8	42.4	40.6	39.3
Yugoslavia:	35.4	37.3	37.3	36.2	35.4
Total southern countries:	39.2	40.9	40.9	38.4	36.9
Total Eastern Europe	30.0	31.9	34.0	34.8	35.6
	-				

Source: App. table 9.

with production averaging 825,000 tons during 1966-70. Sunflowerseed is the leading oilseed in the south, with Romania being the third largest producer in the world. Eastern Europe's average production of sunflowerseed reached over 1.5 million tons annually during 1966-70. Soybeans are a minor crop in the region, but large increases in production are planned in Romania and Bulgaria.

The availability of domestically produced oilseed meal is limited by the countries' oilseed crushing capacities, which in 1970 totaled only 2.9 million tons (table 36). This amounted to about 60 percent of the needs of the region. Poland and Yugoslavia have definite plans to increase oilseed crushing capabilities by 1975--Poland by 300,000 tons of seed and Yugoslavia by 150,000 tons.

Table 36--Eastern Europe's oilseed crushing capacity and number of mills, 1970

Country	Mills :	Crushing capacity <u>1</u> /
:	Number	Metric tons
Romania	6 large 2 large plus 20 small 4 large 5 large	700,000 400,000 250,000 250,000
Poland	7 large 6 large plus 10 small NA	500,000 400,000 3/ 375,000
Total:	30 large plus 30 small <u>2</u> /	2,875,000

^{1/} In terms of seed, estimated on the basis of 300 days operation as reported by industry officials. 2/ Excludes East Germany. 3/ Estimated from oilseed crushed in 1970.

Source: (80, p. 4).

Potatoes are cultivated on 6 percent of Eastern Europe's agricultural land; 1966-70 production averaged 73.7 million tons annually. As a feed, potatoes are fed heavily to hogs in the northern countries. The frequent shortfalls in potato production in the north, where 9 percent of the land is devoted to their cultivation, can have as much bearing on fluctuations in hog inventories as shortfalls in grain output. Since perishability is a problem with potatoes, Poland, the major producer, has launched a program of developing potato dehydration to reduce spoilage.

Forage crops 19/ are cultivated on about 11 percent of the agricultural land. In 1966-70, average yearly output of 34 million tons of corn for silage, 51.8 million tons of hay, and 25 million tons of fodder beets was a vital part of the winter feed supply. Meadow hay accounts for 42 percent of total hay output, but alfalfa hay production is growing rapidly. Feed beets and hay are produced more widely in the north than in the south.

Permanent pasture occupies a larger land area in the southern countries, where 26 percent of the agricultural land is in pasture. Pasture's share of all of Eastern Europe's agricultural land is 19 percent. In comparison, about one-fourth of the agricultural land of EC-6 is pastureland (82).

Production Trends

Livestock

Production of livestock products in Eastern Europe since 1955 has grown markedly faster than livestock numbers, indicating improved efficiency of the livestock sector. This trend has been particularly pronounced since the mid-1960's (tables 37 and 38).

During 1956-70, the average annual rate of growth of cattle numbers in Eastern Europe remained below 2 percent, and that of cow numbers below 0.5 percent. Total cattle numbers increased faster in the northern countries; cow numbers grew faster in the southern countries. The region's hog numbers increased at an average rate of 1.6 percent per year during the same period. The increase was particularly rapid in the late 1950's and early 1960's; it was much more modest in recent years. Hog numbers have declined slightly in Czechoslovakia, Bulgaria, and Hungary since 1961. Sheep numbers grew rapidly in Romania and Bulgaria during 1956-70, offsetting decreases in the northern countries and Yugoslavia. Poultry numbers increased at the rate of 2.7 percent per year from 1956 to 1970. During the same period, meat production increased 3.3 percent annually, from an average of 7.8 million tons in 1956-60 to 10.8 million tons in 1966-70. In the 1960's meat production rose faster than in the 1950's, but this was partly due to excessive slaughter, which hampered growth by the end of the decade.

Since 1956, poultry meat production has shown the highest growth rate followed by beef and veal. Pork production has suffered from wide cyclical variations, but the latest trend is up. Most of the countries recovered from the last cyclical low, which occurred in 1969 or 1970, and achieved record production in 1971 (16).

Milk production in 1961-65 was 1.5 percent above that in the preceding 5-year period. In 1966-70, it was 3.3 percent above the 1961-65 level. Egg production increased 4.1 and 3.9 percent, respectively, in the two periods.

^{19/} Corn for silage and green feed, hay, and fodder beets.

Table 37--Livestock inventory and annual growth rates, by livestock class, Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections $\underline{1}/$ to 1975 and 1980

			1								
Animal and period	: Unit	Czecho- slovakia	East	: Poland :	Total northern countries	: Bulgaria :		Romania		Total southern countries	
Cattle: 1956-60 1961-65	: : 1,000 head : do.	: 4,466	3,966 4,605	7,808 8,820	15,938 17,891	1,443 1,517	2,021	4,543 4,639	5,070 5,451	13,077 13,550	29,015 31,441
1966-70	: do.	: 4,352	4,996	10,083	19,431	1,366	1,973	5,127	5,455	13,921	33,352
Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70	Percent do.	1.4	3.0 1.6	2.5	2.3 1.6	1.0	-0.8 0.3	0.4	1.5	0.7 0.5	1.6
lows:	:										
	: 1,000 head : do.	: 2,075 : 2,019	2,124	5,583 5,811	9,782 9,964	546 578	923 846	2,019	2,531 2,658	6,019 6,136	15,801 16,100
1961-65 1966-70	do.	: 1,923	2,134	5,910	10,010	588	767	2,157	2,775	6,287	16,297
Annual rate of growth:	:	:									
	Percent	· : -0.7	0.1	0.8	0.3	1.2	-1.6	0.3	1.0	0.4	0.4
1961-65 to 1966-70	: do	: -1.0	0.4	0.3	0.1	0.3	-1.8	1.0	0.9	0.5	0.2
ogs:		:									
1956-60			8,279	12,052	25,743	1,838	6,084	4,081	4,891	16,894	42,634 47,597
1961-65 1966-70		: 5,948 : 5,235	8,654 9,241	13,463	28,065 29,143	2,331 2,221	6,551 6,173	4,835 5,668	5,815 5,429	19,532 19,491	48,634
11	:										
Annual rate of growth: 1956-60 to 1961-65	: Percent	: 1.9	0.9	2.2	1.7	4.9	1.5	3.4	3.5	2.9	2.2
	: do	-2.0	1.1	1.6	0.7	-1.1	-1.1	3.2	-1.3	0	0.4
ultry:	:	:									
1956-60			31,833	61,360	118,078	15,828	25,307	35,000	27,698	103,833	221,91
1961-65		: 28,785 : 31,168	37,241 38,880	77,231 82,240	143,257 152,288	22,188 25,334	28,388	39,022 46,542	30,205 36,162	119,803 138,732	263,060 291,020
	: 40	: 51,100	30,000	02,240	132,200	23,334	30,074	40,542	30,102	130,752	272,020
Annual rate of growth: 1956-60 to 1961-65	: Percent	: 2.9	3.2	4.7	3.9	7.0	2.3	2.2	1.7	2.9	3.4
1961-65 to 1966-70	: do	: 1.6	1.1	1.3	1.2	2.6	1.6	3.5	3.6	3.0	2.0
leep: 1/	:	:									
1956-60	: 1,000 head	: 878	1,989	3,307	6,174	8,111	1,782	10,847	11,061	31,801	37,975
1961-65	: do	: 574	1,922	2,654	5,150	10,070	2,350	12,217	10,232	34,869	40,019
1966-70		: 787 : 680	1,840 1,600	2,703	5,330 4,722	9,818 9,850	2,325	13,950	9,849 8,334	35,942 24,679	41,272
1980		: 677	1,600	2,354	4,631	9,880	2,322	14,370	8,189	23,881	29,512
Annual rate of growth:	:	:									
1956-60 to 1961-65	: Percent	: -6.0	-0.6	-3.7	-3.1	4.4	5.7	2.4	-1.5	1.8	1.0
		: 6.5	-0.8	0.3	0.7	-0.5	0	2.6	-0.8	0.6	0.0
1966-70 to 1975 1975 to 1980		: -1.9 : 0	-1.8 0	-1.4 -0.8	-1.5 -0.4	0	0.1	0.1	-2.0 -0.4	-3.9 -0.2	-3.0
rses: 1/	:	:									
	: 1,000 head	: 489	620	2,607	3,716	416	700	1,198	1,289	3,603	7,319
1961-65	: do	: 261	373	2,622	3,256	279	378	838	1,170	2,665	5,92
1966-70		: 257	215	2,574	3,046	215	272	699	1,117	2,303	5,349
1975	: do : do	: 100 : 59	88 63	2,510 2,360	2,698 2,482	170 144	190 139	618 560	987 902	1,965 1,745	4,663
	:			,	,					,,	,
Annual rate of growth: 1956-60 to 1961-65	: Percent	: -7.9	-7.0	0.1	-2.4	-5.9	-7.9	-5.4	-1.8	-4.7	-3.
	: do	-0.3	-7.3	-0.4	-1.3	-4.2	-5.1	-3.1	-0.9	-2.6	-1.8
		: ~7.0 : ~7.1	-6.8 -5.1	-0.4 -1.2	-1.5 -1.5	-2.8 -2.8	-3.8 -4.9	-1.6	-1.6	-2.0 -2.1	-1.8 -1.7
1777 60 1700	. 40	/.1	-3.1	-1.2	~1.3	-2.8	-4.9	-1.7	-1.7	-2.1	-1.,

 $[\]frac{1}{2}$ Only sheep and horse numbers have been projected. Feed requirements of other livestock were projected on the livestock product basis. See table 38 and the text section Projections of Livestock Production, p. 88.

Sources for 1956-70 data: $(\underline{6}, \underline{13}, \underline{19}, \underline{37}, \underline{52}, \underline{74}, \underline{81})$.

Table 38--Production of livestock products (live weight) and annual growth rates, by type of product, Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980

Product and period	: Unit :	Czecho- slovakia		: Poland :	Total northern countries	: Bulgaria	: Hungary	Romania	Yugo- slavia	Total southern countries	: Total : Eastern : Europe
Beef and veal: 1956-60	: 1,000 m.t. do do do do do	: 425 : 541 : 625 : 711	307 414 554 704 833	575 809 1,014 1,318 1,536	1,236 1,648 2,109 2,647 3,080	120 141 187 250 296	219 258 305 356 395	358 354 443 507 578	297 425 511 634 725	994 1,178 1,446 1,747 1,994	2,230 2,826 3,555 4,394 5,074
1956-60 to 1961-65 1961-65 to 1966-70	Percent do	: 3.7 : 4.9 : 2.1 : 2.6	6.2 6.0 3.5 3.4	7.1 4.6 3.8 3.1	5.9 5.1 3.3 3.1	3.3 5.8 4.2 3.4	3.4 3.4 2.2 2.1	0 4.6 2.0 2.1	7.4 3.7 3.1 2.7	3.4 4.2 2.8 2.5	4.8 4.7 3.1 2.8
Pork: 1956-60. 1961-65. 1966-70. 1975. 1980.	: 1,000 m.t. : do : do : do	: 542 : 607 : 662 : 815 : 927	847 853 1,060 1,157 1,254	1,452 1,554 1,678 2,020 2,156	2,841 3,014 3,400 3,992 4,337	179 218 254 290 323	600 656 701 911 988	342 406 553 786 1,026	482 637 656 815 905	1,603 1,917 2,164 2,802 3,242	4,444 4,931 5,564 6,794 7,579
1956-60 to 1961-65 1961-65 to 1966-70	: do	: 2.3 : 1.7 : 3.0 : 2.6	0.2 4.4 2.2 1.6	1.4 1.6 2.7 1.3	1.2 2.5 2.3 1.6	4.0 3.1 1.9 2.2	1.7 1.4 3.8 1.6	3.5 6.3 3.9 3.3	5.7 0.6 3.1 2.1	3.6 2.5 3.4 2.3	2.1 2.5 2.9 2.2
1956-60	: do : do	20 : 14 : 12 : 10	45 45 44 48 51	57 45 45 38 35	122 104 101 96 95	95 128 177 210 238	16 26 36 44 49	109 127 145 167 196	113 111 115 114 115	333 392 473 535 598	455 496 574 631 693
1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975	: do	: : -5.4 : -2.6 : -2.2 -1.6	0 0 1.2 1.2	-3.9 -0.2 -2.4 -2.5	-2.8 -0.6 -0.7 -0.2	6.2 6.6 2.5 2.5	10.2 6.7 2.9 2.2	3.2 2.6 2.0 3.2	-0.4 0.7 0	3.3 3.8 1.8 2.2	1.7 3.0 1 4 1.9
1961-65	: do	56 71 104 170	56 86 103 138 163	88 124 179 282 396	200 281 386 590 752	37 48 87 135 170	164 184 242 326 386	76 96 141 206 279	79 89 149 214 263	356 417 619 881 1,098	556 698 1,005 1,471 1,850
Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975 1975 to 1980	: do : do	. 4.9 : 7.9 : 7.3 : 2.6	9.0 3.7 4.3 3.4	7.1 7.6 6.8 7.0	7.0 6.5 6.3 5.0	5.3 12.6 6.5 4.7	2.3 5.6 4.3 3.4	4.7 8.0 4.9 3.8	2.4 10.8 5.3 4.2	3.2 8.2 5.0 3.9	4.6 7.5 5.5 4.4
1966-70 1975	: do : do : do	972 : 1,117 : 1,319 : 1,620 : 1,840	1,255 1,398 1,761 2,047 2,301	2,172 2,532 2,916 3,658 4,123	4,399 5,047 5,996 7,325 8,264	431 535 705 885 1,027	999 1,124 1,284 1,637 1,818	885 983 1,282 1,658 2,039	971 1,262 1,431 1,777 2,008	3,286 3,904 4,702 5,957 6,892	7,685 8,951 10,698 13,282 15,156
1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975	: do	2.5 3.4 2.9 2.6	2.0 4.6 2.1 2.4	3.2 2.8 3.3 2.4	2.7 3.4 2.9 2.4	4.3 5.2 3.5 3.0	2.0 2.5 3.4 2.1	2.1 5.5 3.2 3.0	5.4 2.4 2.9 2.5	3,4 3.6 3.2 2.6	3.0 3.5 3.1 2.8
1966-70 1975	: do : do : do	3,764 3,766 4,522 5,380 5,889	5,537 5,703 7,036 7,915 8,672	11,584 12,849 14,615 17,250 18,800	20,885 22,318 26,173 30,545 33,361	598 853 1,194 1,451 1,570	1,840 1,825 1,917 2,128 2,298	2,530 2,884 3,580 4,082 4,521	2,729 2,906 3,366 4,030 4,393	7,688 8,468 10,057 11,691 12,782	28.573 30,786 36,230 42,236 46,143
Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975 1975 to 1980	do do	: 0 : 3.7 : 2.5 : 1.8	0.6 4.2 1.7 1.8	2.1 2.6 2.4 1.7	1.3 3.2 2.2 1.8	7.3 7.0 2.8 1.6	-0.2 1.0 1.5 1.6	2.6 4.4 1.9 2.0	1.3 3.0 2.6 1.7	1.9 3.5 2.2 1.8	1.5 3.3 2.2 1.8
Eggs: 1956-60. 1961-65. 1966-70. 1975.	: do : do	: 2,085 : 2,589 : 3,346 : 4,510 : 5,268	2,962 3,517 4,114 4,557 4,899	4,771 6,050 6,543 7,973 8,888	9,818 12,156 14,003 17,040 19,055	959 1,348 1,618 1,876 2,082	1,708 2,046 2,751 3,675 4,293	2,057 2,502 3,131 4,414 4,988	1,511 1,601 2,330 3,223 3,871	6,235 7,497 9,830 13,188 15,234	16,053 19,653 23,833 30,228 34,289
Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975 1975 to 1980	: do : do	: 4.4 : 5.2 : 4.3 : 3.1	3.5 3.2 1.4 1.4	4.9 1.6 2.9 2.2	4.4 2.9 2.8 2.3	7.0 3.7 2.1 2.1	3.0 6.0 4.2 3.2	4.0 4.6 5.0 2.5	1.2 7.8 4.7 3.7	3.8 5.5 4.3 2.9	4.1 3.9 3.4 2.6

 $[\]underline{1}/$ Rabbits and game excluded. $\underline{2}/$ Converted to 3.5-percent fat content in East Germany.

Sources for 1956-70 data: (4, 11, 17, 33, 46, 66, and 73).

Grains

Eastern Europe's average grain production increased 3.6 percent annually between 1961-65 to 1966-70-twice as fast as between 1956-60 and 1961-65. Higher than average increases in wheat production were offset by decreased production of oats and rye. Regional grain production of 70.5 million tons a year in 1966-70 surpassed the 1956-60 average by about 16 million tons (table 39). Wheat accounted for half of this increase.

The increase in grain production was due to yield increases. Area sown to grain declined by 1.5 percent annually from 1956-60 to 1961-65 and by 0.5 percent from 1961-65 to 1966-70. But area under wheat remained relatively stable, with some expansion occurring in the northern countries and some contraction in the south (table 40). A policy of self-sufficiency in grain production has dictated expansion of grain area, with the result that the countries with surplus grain production have reduced the area while the countries with grain deficit have increased it. Thus, the difference in relative area in grain between countries has narrowed in the last decade (table 34).

Total grain yields in the region increased at an average annual rate of 3.4 percent from 1956-60 to 1961-65, and at 4.2 percent from 1961-65 to 1966-70. Yield growth in the south was better than in the north because the southern countries grow corn which has much higher yields than other grains and which also has shown more rapid improvement in yields. Wheat yields in the southern countries remained below those in the northern countries, but the gap has narrowed in recent years (table 41).

Oilseeds and Roughages

Except for a 1961-65 decline and subsequent recovery in fodder beet production, output of oilseeds and roughages generally showed an upswing during the decade between 1956-60 and 1966-70 (table 42). Between the two periods, average production of nongrain feeds increased as follows:

	Percent
Corn for silage and green feed	72
Hay	35
Fodder beets	9
Potatoes	13
Sunflowerseed	103
Rapeseed	144

Except for potato production, production of nongrain feed crops has benefited from both increased yields and increased plantings. Increased potato production has come from higher yields; area declined 8 percent from 1956-60 to 1966-70. Of the seven East European countries, only the minor producers Romania and Yugoslavia registered area increases. Potatoes' large labor input requirements and relatively low profitability led to the area contraction.

Total Eastern Europe	15,442 18,213 24,067 29,521 33,285	4.800.0	181 136 176 176 176	-5.4 5.2	39,105 40,647 46,230 54,955 60,908	0.084 9.08 1.08
Total	10,312 12,070 14,992 16,353 17,040	8.0 0.4 0.0 0.0	181 136 176 176	5.5	18,819 20,428 24,864 31,308 35,728	1.7 4.0 3.5
Yugo- slavia	2,970 3,576 4,490 5,071	7.7.7 1.3.6	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0 !!!	6,323 6,738 8,405 10,287 11,525	1.4 N.9 S.9 S.9 S.9 S.9 S.9 S.9 S.9 S.9 S.9 S
Romania	3,300 4,321 4,682 5,005 5,124	5.5 1.6 0.4	65 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	_1.4 10.1 	5,843 6,526 7,952 10,042 11,465	9.4.W 8.0.W
Hungary	1,794 1,965 2,911 3,000	1.9	75 40 40 40 40	12.9	4,563 4,681 5,218 6,698 7,880	0 0 m m
Bulgaria	2,248 2,208 2,909 3,277 3,455	-0.4 5.7 1.5	37 448 488 448	5.7	2,090 2,483 3,289 4,281 4,858	8 7 8 9 7 7 8 7
Total	5,130 6,124 9,069 13,168 16,245	8.8 8.2 4.7 4.3			20,286 20,219 21,366 23,647 25,180	1
Poland	2,310 2,988 4,260 6,360 8,231	V F V V 0 m V w	11111		11,725 12,012 12,535 13,647 14,395	0.4 1.3 1.3
- East a:Germany	1,307 1,357 1,943 2,839 3,471	0 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -			4,735 4,488 4,730 5,391 5,641	1.0 0.1 0.4 0.0
Czecho- slovakia	1,513 1,779 2,866 3,969 4,543	3.2 10.0 4.7			3,826 3,719 4,101 4,609 5,144	-0.6 1.9 2.3
Unit	1,000 M.T. do.	Pct. do. do.	,000 M.T. do. do. do.	Pct. do. do.	,000 M.T. do. do. do.	Pct. do. do.
Grain and period	Wheat: 1956-601961-651966-701980	Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975	Rice: 1/ 1956-60	Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975	Coarse grains: 1956-601 1961-651 1966-701	Annual rate of growth: 1956-60 to 1961-65: 1961-65 to 1966-70: 1966-70 to 1975:

See notes at end of table.

Table 39--Grain production in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980--Continued

Grain and period	Unit		Czecho-: slovakia:	.o-: East :.ia:Germany:	Poland	Total	Bulgaria	Hungary	Romania	Yugo- slavia	Total	Total Eastern Europe
	1,000 1	1.T.:		6.042	14.035	25.416	4,382	6.429	9,186	9,315	29,312	54.728
1961–65	do.		5,498	5,845	15,000	26,343	4,728	6,682	10,887	10,337	32,634	58,977
1966-70	do.		796,9	6,673	16,795	30,435	6,246	8,169	12,699	12,918	40,032	70,467
1975	do.	••	8,578	8,230	20,007	36,815	7,606	9,738	15,112	15,381	47,837	84,652
1980	do.		9,687	9,112	22,626	41,426	8,361	10,920	16,589	16,989	52,859	94,285
••		••										
Annual rate of growth: :		• •										
1956-60 to 1961-65:	Pct.	••	9.0	9.0-	7.4	0.8	1.5	0.8	3.5	2.1	2.1	1.5
1961-65 to 1966-70;	do.	••	4.9	2.6	2.3	3.0	5.7	7.0	3.2	7.6	4.2	W. S.
1966-70 to 1975	do.		3.0	3.0	2.5	0.0	2.9	2.5	2.5	2.5	2.5	N. 03
1975 to 1980	do.		2.4	2.0	2.0	2.0	1.9	2.3	2.0	2.0	2.1	0.0

1/8 ince rice production in Eastern Europe is of relatively little significance, production levels were assumed constant through at the 1966-70 level.

Sources for 1956-70 data: (6, 13, 19, 37, 52, 74, 81).

Total Eastern Europe	15.9 18.4 29.2 33.1	6.4 m d 0 0.0 d d	24.3 27.8 26.9 26.9	8.01	16.7 19.2 23.2 29.1	0 m m n 0 v m n
Total E	13.8 16.7 21.6 26.7 30.1	8.5.2 8.5.2 8.5.2	24. 27.2 26.9 26.9 26.9	8 8 1 1	16.3 19.6 25.0 32.0	3.7
Yugo-	15.2 17.9 23.4 32.8		38 38 38 38 38 38 38 38 38 38 38 38 38 3	©] •	17.8 20.1 26.2 33.2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Romania S	11.2 14.6 16.9 25.4 30.6	5.0 3.0 1.4	21.5 28.6 26.0 26.0	5.9	13.4 17.2 21.3 28.6 34.0	7.44 4.4 8.3
Hungary R	15.0 18.6 24.3 31.4 34.8	4.4 5.5 3.7	20.6 18.9 19.0	0.2	19.5 22.2 28.0 34.0	0.4° 0.4° 0.4°
Bulgaria H	16.3 18.2 27.3 33.2	0 8 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8 9 9 9 9 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9	1.9	16.6 21.2 28.7 36.0 39.8	
Total E	20.0 22.8 26.9 31.8 35.2		11111		17.1 18.8 21.4 26.0 28.2	1001
Poland	16.1 19.7 23.2 27.4 30.8	0 7 7 7 . 0 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	11111	1111	14.7 16.7 18.9 22.1	0 0 0 0 0 0 0 0
zecho-: East ; ovakia:Germany:	31.2 31.2 31.6 35.7 41.6	0001	1111		23.4 24.5 26.7 31.8	11.0
Czecho- slovakia:	21.2 24.0 28.9 35.0 39.3	0 m 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			20.5 21.4 25.8 30.4	00000
Unit	Quintals ha. ha. do. do.	Pet. do. do.	Quintals ./ha. do. do.	Pct. do. do.	Quintals: /ha. do. do.	Pct. do.
Grain and period	Wheat: 1956-60. 1961-65. 1966-70. 1975.	Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975	Rice: 1956-60. 1961-65. 1966-70. 1975	Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975	Coarse grains: 1956-60	Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975

Table 40--Grain yields in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980--Continued

		••	••	••	••							
Grain and period	Unit		Czecho-: East slovakia:Germany	East :	Poland:	Total	Bulgaria	Hungary	Romania	: Yugo- : slavia :	Total	Eastern
				••	**							eur obe
Total grains:												
1956-60 Quintals	Quintals		20.7	24.7	14.9	17.6	16.5	18.0	12.6	16.9	15.4	16.3
1961-65	/ha.	٠.	22.2	25.8	17.2	19.6	19.7	21.0	16.1	19.3	18.4	18.9
1966-70	do.		27.0	28.8	19.9	22.8	28.1	26.5	19.5	25.2	23.6	23.2
1975	do.	••	32.4	34.6	23.5	27.8	34.8	33.0	24.3	31.6	30.0	28.9
1980	do.	••	37.2	37.7	26.5	30.6	38.6	38.4	29.7	36.2	34.6	32.7
		••										
Annual rate of growth:		••										
1956-60 to 1961-65	Pct.	••	Ι, 4	0.8	2.8	2.1	3.5	3.2	5.0	5.6	3.5	3.0
1961-65 to 1966-70	do.		η.0	2.3	3.0	3.0	7.4	6.2	3.9	5.5	5.1	4.2
1966-70 to 1975	do.	••	5.6	5.6	2.4	3.2	3.1	3.5	3.2	3.2	3.5	3.2
1975 to 1980	do.		2.8	1.7	2.4	1.9	2.1	3.0	4.1	2.8	5.9	2.5
Sources for 1056-70 data (6 13 10	(6 13	0	37 52 74 81)	74.81)								

Sources for 1956-70 data: $(\underline{6}, \underline{13}, \underline{19}, \underline{37}, \underline{52}, \underline{74}, \underline{81})$.

Total Total Eastern Europe	,462 10,030 ,240 9,924 ,941 10,311 ,127 10,267 ,660 10,272	-0.6 -0.8 -1.6 -1.5	74 50 65 65 65 65 65 65	-7.5 5.4 5.4 	,519 23,384 ,425 21,167 ,958 19,937 ,774 19,170 ,587 18,524	-1.8 -0.8 -0.3 -0.12 -0.4
Yugo- Tot	1,954 7. 2,002 7. 1,914 6. 1,767 6. 1,665 5.		00000	1111	3,559 11. 3,354 10. 3,212 9. 3,102 9.	0.000 1.000 1.000
Romania	2,932 2,966 2,764 2,418 2,199	0.2	20 14 25 25 25	12.3	4,359 3,792 3,736 3,514 3,372	-2.5 -0.2 -1.2
Hungary	1,198 1,056 1,199 955 862	6.00 L	35 19 21 21 21	1.9	2,343 2,107 1,866 1,970 1,963	1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-
Bulgaria	1,378 1,216 1,064 987	-2.3 -2.4 -1.0	13 13 13 13 13 13 13 13 13 13 13 13 13 1		1,258 1,172 1,144 1,188 1,219	4.00 4.00 0.00
Total	2,569 2,685 3,370 4,140 4,612	0.8 4.7 8.0 2.1			11,865 10,742 9,979 9,396 8,937	-1.7 -1.1.4 -0.8
Poland	1,435 1,516 1,516 2,333 2,672	1. 8. 8. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9.	11111		7,975 7,177 6,619 6,187 5,860	11.0
zecho-: East ovakia:Germany	419 430 544 683 784	0.4 7.4 8.8			2,024 1,831 1,771 1,693	0.01.0
: Czecho- :slovakia	715 739 991, 1,134	0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			1,866 1,734 1,589 1,589	1.1.1 1.1.5 1.0.1
Unit	1,000 ha.	Pct. do. do.	1,000 ha.	Pct. do. do.	1,000 ha.	Pct. do. do.
Grain and period	Wheat: 1956-60 1961-65 1966-70 1975 1980.	Annual rate of growth: 1956-60 to 1961-65: 1961-65 to 1966-70: 1966-70 to 1975:	Rice: 1956-60 1961-65 1966-70 1975.	Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975	Coarse grains: 1956-60	Annual rate of growth: 1956-60 to 1961-65 1961-65 to 1966-70 1966-70 to 1975

Table 41--Grain area in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980--Continued

Grain and period	Unit	:slo	Jzecho-: lovakia:	East Germany:	Poland	Total	Bulgaria	Hungary	Romania	Yugo- slavia	Total	Total Eastern Europe
Potal grains:							;					
1956-60	,000 ha.	••	2,581	2,443	9,410	14,434	5,649	3,576	7,311	5,519	19,055	
1961–65	do.		2,473	2,261	8,693	13,427	2,399	3,182	6,772	5,362	17,715	
1966-70	do.	• •	2,580	2,315	8,454	13,349	2,221	3,086	6,525	5,132	16,964	30,313
1975	do.	••	2,650	2,376	8,510	13,536	2,188	2,946	5,957	4,875	15,966	
1980	do.	••	2,600	2,417	8,532	13,549	2,166	2,846	5,596	4,704	15,312	28,861
		• •										
Annual rate of growth: :												
1956-60 to 1961-65:	Pct.	• •	-0.8	-1.5	-1.6	-1.4	-2.0	-2.3	-1.5	9.0-	-1. ¹	-1.4
1961-65 to 1966-70:	do.	••	0.8	η.Ο	9.0-	-0.2	-1.5	9.0-	7.0-	6.0-	-0.8	-0.5
1966-70 to 1975	do.		٥.4	4.0	0.1	0.1	-0.2	7.0-	-1.4	-0.7	-0.8	+ 0.0−
1975 to 1980	do.		+0.0−	٠,0	1	1	-0.2	-0.8	1.8	9.0-	-0.8	₹.0-
•												

Sources for 1956-70 data: $(\underline{6}, \underline{13}, \underline{19}, \underline{37}, \underline{52}, \underline{74}, \underline{81})$.

Table 42--Production of roughages and oilseeds in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980

Total oilseeds		71 76 80 85 89	187 186 229 230 235	160 387 583 715 809	418 649 891 1,029 1,133	F
Other oilseeds	c tons	13 11 12 12 12	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	9 8 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	88 86 108 121	
Rapeseed	1,000 metric	53 69 73	169 171 219 215 221	108 323 516 633 714	330 553 804 921 1,012	
Sunflower- seed						
Permanent pasture	1,000 hectares	843 788 790 773	431 528 592 686 752	1,790 1,772 1,683 1,705	3,064 3,088 3,065 3,164	
Potatoes		7,282 5,635 5,676 5,579 5,566	13,370 12,066 12,283 12,017 11,829	36,302 h3,682 h7,879 54,450 59,140	56,954 61,383 65,838 72,046 76,535	
Fodder	ic tons	3,119 2,637 3,600 3,060 2,040	10,821 8,255 10,198 8,656 8,217	4,708 6,214 7,828 9,816 11,308	18,648 17,106 21,626 21,532 21,565	
Нау	1,000 metric	8,371 7,814 9,159 9,953	6,047 6,077 7,294 8,274 9,059	11,878 14,725 20,116 23,935 27,286	26,296 28,616 36,569 42,162	
Corn silage and green feed	귀	4,479 6,271 7,183 7,397 7,595	6,260 9,058 10,477 11,520 12,240	1,757 3,375 4,462 5,400 6,000	12,496 18,704 22,122 24,317 25,835	
Country Co and period B	t	1956-60 1961-65 1966-70 1975	East Germany: 1956-60 1961-65 1966-70 1975	Poland: 1956-60 1961-65 1966-70	Total northern countries: 1956-60 1961-65 1966-70 1975 1980	
			85			

Table 42--Production of roughages and oilseeds in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980--Continued

Total oilseeds		284 369 507 583 649	109 122 127 130 130	435 566 826 1,321	113 225 319 470 595
Other oilseeds	ic tons	41 46 52 52 58	12 1 30 30	85 96 233 290 290	18 114 133 23
Rapeseed	1,000 metric ton		2 12 15 115		91111
Sunflower- seed		243 337 461 531	115 115 86 85 85	350 502 730 1,088	89 207 299 440
: Permanent : pasture :	1,000 hectares	776 900 1,113 1,110 1,105	937 926 875 838	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4,708 4,7332 4,336 4,336
Potatoes		335 400 380 305 296	2,477 1,735 1,659 1,376	2,862 2,578 2,849 3,308	2,830 2,708 3,006 3,170
Fodder	c tons	576 439 818 1,004 1,153	2,407 1,119 1,471 1,580 1,684	329 330 345 345	1,156 1,000 878 817 744
Нау	1,000 metric	1,481 1,790 2,232 2,540 2,778	3,512 2,645 3,236 3,632 3,945	4,348 4,981 6,597 7,638	2,600 2,600 3,166 4,759
Corn silage and green feed		2,261 3,089 3,341 3,488 3,609	3,387 4,528 6,182 6,905	1,690 4,756 3,382 3,329 3,132	NA NA NA NA
Country and period		1956-60 1961-65 1966-70	Hungary: 1956-60 1961-65 1966-70	Romania: 1956-60 1961-65 1966-70	Yugoslavia: 1956-60 1961-65 1966-70

Table 42--Production of roughages and oilseeds in Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980--Continued

Rapeseed : Other : Total : oilseeds :	1,000 metric tons	8 156 1,282 21 111 1,282 21 183 1,780 22 248 7,414 23 409 3,058	288 200 400 600 600 600 600 600 600 6
Sunflower- seed		1,161	1,177 1,101 1,101 1,101 1,101 1,01 1,01
Permanent pasture	l,000 hectares	9,212 9,322 11,409 11,338	12,276,12,310
Potatoes		88,77,00 100,100 100,100 100,100 100,100	65,458 68,804 73,732 80,205
Fodder	ic tons	4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	23,166 19,1994 25,155 25,278
Hay	L 000 metric	11,941 12,018 15,231 17,569	38,237 40,634 51,800 59,731 66,318
Corn silage and green feed	~I)	1/7,338 1/12,373 1/11,945 1/12,999	1,19,834 1,31,077 1,34,067 2,37,316 1,39,481
Country and period	Total southern	countries: 1956-60. 1961-65. 1966-70. 1975.	Total Eastern Europe: 1956-60 1961-65 1975

1/ Excluding Yugoslavia.

Sources for 1956-70 data: (6, 13, 19, 37, 52, 74, 81).

Production Projections

Livestock Products

In general, analysis of historical data indicates a more dependable correlation between livestock product production and feed use than between livestock inventories and feed use. Hence, projections were made for the production of livestock products, while animal numbers were projected only for sheep and horses (tables 37 and 38).

The projections were based on the assumption that all the factors interacting in the 1960's will continue to exercise their impact in the 1970's. Therefore, the projections basically represent extrapolation of past trends, linear or logarithmic. Methodological details are given in the section entitled Production Patterns and Projections. Official country plans, FAO projections (21), and demand projections of this study were compared in deciding on most likely future production levels. When official country plans indicated lower production than that implied by trend extrapolation, the plan levels were accepted. When planned levels were higher than those in the trend extrapolation, the possibility of achieving plan targets was analyzed.

Total meat production in the region is projected to increase at a rate of 3.1 percent from the base period through 1975 and at 2.8 percent during 1976-80. Beef and veal production will continue to increase at a higher rate than pork production—3.0 percent versus 2.6 percent from the base period through 1980. During 1966-70, the share of beef and veal in total meat production was 33 percent and that of pork 52 percent. The share of beef and veal will remain about the same in 1980, while pork's will decline slightly to 50 percent. The highest increase in beef and veal production will be in Bulgaria and the lowest in Romania and Hungary. Growth in mutton production in the southern countries will be partly offset by a decline in the northern countries.

Poultry will remain the fastest growing of all meat types and by 1980 is projected to account for 12 percent of total meat produced in the region, compared with 9 percent in 1966-70. The production growth rate for the region is projected at 5.5 percent annually from 1966-70 through 1975 and at 4.4 percent annually during 1976-80. The growth rate for poultry production has been declining in every country except Poland. But the present relatively low per capita consumption of poultry meat in Poland indicates that even a fast increase in the poultry meat production can be absorbed by domestic consumption.

Milk production is expected to increase about 2 percent per year through 1980 and will continue to derive from improved productivity per cow rather than from increased number of cows. In Hungary, as a result of a long-term decline in cow numbers, the available breeding stock seems inadequate to maintain growth. Thus, Hungary's milk production is expected to grow by only 2 percent annually. In Romania, past performance did not justify an upward adjustment of the extrapolated trend as was shown in the Government's 1971-75 plan. However, a better future compliance with the plan is possible.

Egg production is projected to increase a little over 3 percent per year irom 1966-70 through 1980, mainly as a result of higher productivity. The number of horses in the region will decline by nearly 2 percent annually, as it did during the 1960's.

rains

Total grain output in the region is projected to increase from 70.5 illion tons annually in 1966-70 to 84.7 million tons by 1975, and 94.3 illion tons by 1980 (table 39). This result is based on separate area and rield projections for the main types of grains in each country of the region. inear trend, based on time, was used except for Czechoslovakia and East Fermany, where planned fertilizer use was added as a second variable because it provided statistically better results than the time variable alone. The linear trend approach assumes that future aggregate impact of production factors on output will remain similar to that of 1956-70. Only conjectures yould be made as to how individual factors may influence grain production.

Total grain area in the region is projected to decrease 0.4 percent unually from 1966-70 through 1980 (table 41). Thus, the increase in output vill be due to increased yields. However, the share of grain area in the cotal crop area will slightly increase in the northern countries. It will be due to increase in the southern countries, in favor of oilseeds and forage crops, and by 1980 it will attain the same level in both areas--54.3 percent (table 34). The share of wheat in total grain area will continue to increase in the northern countries and decrease in the southern ones (table 35).

Average grain yield is projected to increase 3.2 percent annually through 1975 from the 1966-70 average, and 2.5 percent annually during 1976-80. Innual increase in wheat yield will be 2.7 and 2.3 percent, respectively (table 40).

Official plans will remain one of the leading production factors. Plan targets call for yield increases in every country. To achieve the goals, the governments will probably continue to use fiscal, monetary, and administrative incentives as in the recent past. Grain prices, together with bonus payments, will be adjusted annually. Hungary and Yugoslavia are expected to keep their present less rigidly administered price policy.

Progress in the application of technology and an increase in managerial competence are expected to lead to more efficient use of resources and increased production. More specifically, increased yields will be achieved through improved quality and increased quantity of fertilizers, better and more machinery, new seed varieties, and additional land improvements.

Dilseeds and Roughages

To implement their ambitious 1971-75 livestock development plans, the East European countries have begun to stress an increase in nongrain feed production, with particular emphasis on expanding oilseeds production and

forage crop areas. Alfalfa and corn silage areas are to receive particular attention. Among oilseed crops, sunflowerseed and rapeseed are expected to increase in production, and soybean production is commanding new interest. Romania, for example, plans to double soybean area to 300,000 hectares and increase sunflowerseed area—at the expense of wheat production. Bulgaria and Czechoslovakia also plan to expand soybean area and Yugoslavia sunflowerseed area. Although East European potato area declined during the decade between 1956-60 and 1966-70, Hungary and East Germany are planning to arrest this trend.

Increased yields, resulting from higher fertilizer use and extended irrigation facilities, will also be relied on to boost nongrain feed production. Production of nongrain feed crops is projected to grow through 1980 at the following annual rates for the region: Sumflowerseed 4.5 percent; rapeseed 2.1 percent; and corn silage, green feed, and potatoes 1.2 percent (table 42).

A necessary adjunct to the feed base is a viable mixed feed industry. Use of modern feeding programs for the broiler and layer industries, revitalization of the traditional hog industry, and growth of confined beef feeding operations have given impetus to the building of a more sophisticated feed industry in Eastern Eruope. The region has developed this industry during the past decade, and plans further expansion through 1975. Poland, for example, produced only 467,000 tons of mixed feed in 1960, but by 1970 had an output of 4.3 million tons. Output of Bulgaria's mixed feed industry grew from 300,000 tons to 1.5 million tons during the same period. East German production expanded from 696,000 tons to 2.7 million tons (89).

Table 43--Eastern Europe's industrial feed production, 1970 and planned 1975

Country :	1970	: : 1975 planned :
:	Million	metric tons
Czechoslovakia	4.0	5.0
East Germany:	2.7	NA
Poland:	4.3	4.9
: 4		
Bulgaria:	1.5	3.5
Hungary:	2.4	NA
Romania:	1.3	5.0
Yugoslavia:	3.0	NA
Total:	19.2	NA

Sources: (6, 30, 41, 55, 57, 85).

The total regional output of 19.2 million tons of mixed feed was used in the production of 12 million tons of meat 20/ in 1970. In comparison, the mlarged EC produced 48 million tons of mixed feed and 23 million tons of meat (67, 68). The spread between Eastern Eruope and the enlarged EC is treater than the statistics indicate, however, because the quality aspects are in favor of the EC.

In Eastern Europe, many feed mills have been built to supply balanced ations to large state and collective farms. Even though there were 61 large mills in Bulgaria, Czechoslovakia, Humgary, Poland, and Yugoslavia in 1969 (80), much of the compounding of feed is done in smaller onfarm mills. The ations generally are based on corn, soybean meal, and fishmeal. Peanut and sunflower meals are sometimes substituted in place of soybean meal, even though some essential amino acids are lacking in such rations. A substantial increase in mixed feed output is planned through 1975 (table 43).

V. FOREIGN TRADE PATTERNS AND PROJECTIONS

Agricultural Trade and Trade Policies

During the 1960's, agricultural products accounted for about 23 percent of total imports and 20 percent of total exports of the seven countries of lastern Europe. Despite absolute increases in the value of their total as well as agricultural trade, the trade share of agricultural commodities has generally declined.

About two-thirds of the region's total trade is with communist countries, the Soviet Union alone accounting for one-third. Most of this trade is based on bilateral exchanges, but since 1964 multilateral exchanges have been expanding within defined commodity groups, such as raw industrial materials and semimanufactured goods. Six East European countries, the Soviet Union, Mongolia, and Cuba since 1972 are associated for economic and technical cooperation and trade in the Council for Mutual Economic Assistance (CEMA). This consulting body, established in 1949, coordinates economic planning of member countries, through the regulation of trade and clearing arrangements among them. Trade preferences are generally given among CEMA countries, and all trade among members is free of duty. Yugoslavia has an observer's status but is a member of some CEMA technical commissions. 21/

Short-term trade clearings, using the transferable ruble, are effected through the International Bank of Economic Cooperation (IBEC) established in Moscow in 1963. Lack of convertibility of currencies and the consequent barter trade arrangements, as well as fixed prices, have considerably hindered trade expansion of the CEMA countries. Trade valuation of co modities is usually based on average world prices and stabilized for 5-year periods. In

^{20/} Beef and veal, pork, and mutton and lamb.

^{21/} Albania, originally a full CEMA member country, left the organization in 1961.

intra-CEMA trade, short-term trade credits are granted for up to 5 years at 1.5-percent interest, and long-term credits for investment purposes, up to 15 years at 2 percent (51, 75, 89).

Until the early 1960's (early 1950's in Yugoslavia), foreign trade in Eastern Europe was the exclusive domain of each country's Ministry of Foreign Trade. Trade was carried on by a small number of foreign trade corporations which had an absolute monopoly of exports and/or imports of prescribed categories of goods. Since that time, however, foreign trade has undergone considerable tranformation toward decentralization. The number of enterprises dealing in foreign trade has increased, and some large manufacturers are allowed to trade directly. Trading organizations operate on a commission basis, bringing world and domestic prices in closer relationship. The responsibility of Ministries of Foreign Trade is limited to overall coordination of foreign trade, market research, setting of tariff and subsidy policies, management of foreign exchange, and negotiations of trade agreements and protocols. The outcome is a more responsive production-trade relationship.

Except for Czechoslovakia and East Germany, where trade has generally been in equilibrium since the early 1960's, the East European nations carry trade deficits which make up most of their balance of payments deficits. Imports in these countries have grown rapidly as a result of the common goal of accelerated economic development, which in turn has required imports of raw materials, capital goods, and technological inputs. Bulgaria has financed most of its deficit with the Soviet Union. Romania has included a goal in its 1971-75 plan to expand exports to hard currency areas by 20 percent annually to erase its trade deficit. Yugoslavia devalued its currency twice in 1971 to stimulate exports. Poland also is making efforts to expand trade with the West.

Yugoslavia and Czechoslovakia have been members of the General Agreement on Trade and Tariffs (GATT) since its creation in 1947. Romania became a member in 1972, and Hungary a member in 1973. Preparatory to joining GATT, the region's member countries worked out custom schedules. Yugoslavia has been a member of the International Monetary Fund from its beginning. Romania applied for membership in September 1972 and was admitted to membership in December of that year.

Outside of CEMA countries, trade duties are lower on goods originating in countries with "most favored nation" (MFN) tariff agreements and in less developed countries. Higher duties are applied to goods from other countries, including the United States (except for U.S. goods going to Poland and Yugoslavia, which have MFN agreements with the United States). However, tariff barriers are not rigid; they are often lifted if the commodities needed are available only from higher tariff countries. Grains are exempt of duties.

Underlying the expanding East European market for some agricultural commodities—notably livestock feeds—are official policy statements aimed at ultimate self—sufficiency in basic commodities. However, the doctrinal preference for economic autarchy was officially dropped at a CEMA meeting in 1961 (97).

Trade Trends in Grain, Oilseeds, and Livestock Products 22/

Eastern Europe has traditionally been a net importer of grains, oilseeds, oilseed cake and meal, and other animal feeds, and a net exporter of live animals and meats. In the late 1960's, however, imports of grains have tended to decline, while imports of other feeds have increased rapidly. Exports of meats, live cattle, and sheep have generally increased, but exports of pork and live hogs have declined.

Average annual net grain imports in 1966-70 amounted to 4.1 million tons, down from about 7.0 million tons in the previous 5-year period. The three northern countries imported an average of 5.5 million tons of grain during 1956-70. The southern countries have begun to build up exportable surpluses, which during 1966-70 averaged 1.6 million tons annually (table 44).

Imports of protein feeds, two-thirds of which are into the three northern countries, have grown rapidly since the mid-1950's. Regional imports of oil meal and cake more than doubled between 1961-65 and 1966-70 (table 45). In the latter 5 years, Eastern Europe imported annually 1.3 million tons of oilseed cake and meal, 90,000 tons of oilseeds, and 403,000 tons of bran and other milling and vegetable byproducts for feed (28). Bulgaria and Romania, however, export some sunflowerseed, and Poland occasionally exports rapeseed.

In 1966-70, Eastern Europe imported an average of 310,000 tons of meat and livestock per year, and exported 728,000 tons, in carcass weight equivalent. Close to 95 percent of imports and 75 percent of exports were meat and meat products, the rest being live animals (cattle, hogs, and sheep). In the 1960's, meat and livestock imports increased 2.6 percent annually, but exports increased nearly 8.2 percent (table 46). 23/

Czechoslovakia and East Germany are net meat importers, although East Germany exports pork. Other countries of the region are net exporters. In 1966-70, pork accounted for 46 percent of meat exports, beef and veal for 35 percent, poultry for 16 percent, and mutton and lamb for the remaining 3 percent.

Poland is the main exporter of pork and pork products, followed by Yugoslavia, Hungary, Romania, and Bulgaria. Yugoslavia leads in beef and veal exports, but Romania, Hungary, and Poland also export substantial quantities. About half of the region's poultry exports originate in Hungary, the other half coming principally from Bulgaria and Poland.

Exports of live animals from Eastern Europe are quite substantial. In 1965-69, they amounted to an average of 610,000 head of cattle, 1,874,000 sheep, and 277,000 hogs per year (16, 28). Hungary is the chief source of

^{22/} A part of this and of the subsequent section was contributed by William H. Ragsdale.

^{23/} Individual country meat and livestock trade data are shown in app. table 13.

Table 44--Eastern Europe's grain trade by type of grain, averages 1956-60, 1961-65, and 1966-70

Country and grain	1956-60	1961-65	1966-70
:		1,000 metric to	ms
Northern countries:		1,0000110 00	
Imports:			
Wheat:	3,603	4,079	3,839
Rice:	262	180	183
Coarse grains:	1,544	2,343	2,166
Total grain	5,410	6,602	6,188
Exports:			
Wheat	- 136	110	86
Rice	130	110	
Coarse grains	185	224	375
Total grain	321	334	461
TOTAL STAIN	221	224	401
Net trade $\underline{1}/\dots$	-5,089	-6, 268	- 5,727
Southern countries:			
Imports:			
Wheat:	1,336	1,462	741
Rice	76	97	104
Coarse grains:	170	617	. 354
Total grain:	1,582	2,176	1,199
			•
Exports: :			
Wheat:	140	220	1,329
Rice:			
Coarse grains:	850	1,195	1,485
Total grain:	990	1,415	2,814
:			
Net trade <u>1</u> /:	- 592	-761	+1,615
Total Eastern Europe:			
Imports:			
Wheat	4,939	5,541	4,580
Rice:		277	287
Coarse grains		2,960	2,520
Total grain:	, ,	8,778	7,387
:	- 522	, , ,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Exports:			
Wheat	276	330	1,415
Rice			
Coarse grains:	1,035	1,419	1,860
Total grain:	1,311	1,749	3,275
Net trade <u>1</u> /	- 5,680	-7, 029	-½ , 112

¹/ No sign indicates exports; a minus sign (-) = imports.

Sources: $(\underline{6}, \underline{13}, \underline{19}, \underline{37}, \underline{52}, \underline{74}, \underline{81})$.

Table 45--Eastern Europe's net trade of oilseed and oil cake and meal, averages 1956-60, 1961-65, and 1966-70 $\underline{1}/$

Country and commodity	1956-60	1961-65	1966-70
:		1,000 metric tons	
Czechoslovakia: :			
Oilseed:	-121	-113	-141
Oil cake and meal	-42	- 93	-204
East Germany:			
Oilseed	-290	-133	-127
Oil cake and meal:	-7	-129	-388
:			
Poland: : Oilseed:	-83	-38	71 71
Oil cake and meal	-03 -37	-30 -111	- 258
contract with the contract of	-31	-111	-270
Potal northern countries: :			
Oilseed:	-494	-284	-224
Oil cake and meal:	-86	-333	-850
Bulgaria:			
Oilseed:	29	73	90
Oil cake and meal:		-24	- 72
:			
<pre>Hungary: : 0ilseed:</pre>	- 50	- 20	00
Oil cake and meal	-50 2/ - 6	-20 -146	-29 -267
off care and meaters.	<u>2</u> /=0	-140	-201
Romania: :			
Oilseed:	6	26	62
Oil cake and meal:	13	8	-30
: (ugoslavia:			
Oilseed:	-17	-21	11
Oil cake and meal:		-77	-81
:			
Cotal southern countries: :	20	-0	7.01.
Oilseed	- 32	58	134 - 450
oli cake and meal	7	-239	-450
Cotal Eastern Europe: :			
Oilseed:	- 526	-226	- 90
Oil cake and meal:	- 79	- 572	-1,300
:			

No sign indicates exports; a minus sign (-) = imports.

Sources: $(\underline{6}, \underline{13}, \underline{19}, \underline{37}, \underline{52}, \underline{74}, \underline{81})$.

^{1/} Only oilseeds commonly used in animal feeding are considered. These are linseed, peanuts, rapeseed, soybeans, and sunflowerseed.

^{2/} ERS estimate based on incomplete data.

See notes at end of table.

Table $\psi 6$ --Eastern Europe's trade in meat and meat products, and live animals, all in carcass-weight equivalent 1/, averages 1956-60, 1961-65, and 1966-70

averages 1956-60, 1961-65, and 1966-70--Continued

5		Imports				Exports			Né	Net trade 2/	
Country and item	1956-60	1961-65	1966-70	0	1956-60	1961-65	1966-70	1956-60	-60	1961-65	1966-70
Ē						1,000 metric tons	ns				
Total Eastern Europe: Beef and veal	123	158	101		50	135	192	1	33	223	91
Mutton and lamb	y 7 L	V V 4	† †		T02	10	17		20	707 9	2 -
Poultry meatTotal 3/	13	272	293		34	59	88	27	125	191	76
						Live animals	ro.l				
Northern countries:		A		• •	,						
Cattle	910	4 1-	0/0		N 0	11	45	: - 4 : :	4-	27	75
Sheep	·	.	1	• • •	1	1	1		. !	ļ	1
Poultry		-	1 80		22	39	50		:1=	188	715
Southern countries:				•• ••							
Cattle	1 0	1 -	0/0		43	52 17	98	₹	7	52	96
Sheep Poultry All livestock 3/	1 110		∞		2 182	12	22	5	₽ 110	21 18	22
Total Eastern Europe:	,				-	`					
Cattle	9 -	† †	12		7 7 7 8	45	143		υ й.	31	139 8
Sheep	1	}	1		5	12	22		2	12	22
PoultryTotal livestock 3/:	13	18	16		80	119	185	1/9	112	101	169

1/ Excludes offals. 2/ No sign = net exports; a minus sign (-) indicates net imports. 3/ Totals do not necessarily add up due to roundings.

Sources: Appendix tables A-13.

cattle exports, accounting for close to 40 percent of the region's total.

East Germany, Poland, Romania, Yugoslavia, and Bulgaria share the remaining exports. Live hogs come principally from Bulgaria, Hungary, and East Germany. Poland used to export a substantial number of hogs, but in recent years these exports have dwindled to very little. All live sheep exports originate in the southern countries, chiefly in Hungary and Bulgaria.

Direction of Trade

During 1956-70, imports of grains into Eastern Europe reached a peak in 1961-65--with close to 8.8 million tons received annually--and then began to decline. Exports grew steadily from 1.3 million tons annually in 1956-60 to nearly 3.3 million tons in 1966-70. The largest proportions of imports, 37 percent of the total in 1966-70, originated in the Soviet Union (table 47). However, some of these imports were reexports of Western grain. Grain obtaine from the Soviet Union has generally been available on barter trade terms, a decisive factor in a region where hard currencies have been in chronic short supply.

Imports of grain from the United States were highest in 1961-65 when they made up 22 percent of total grain imports (1.9 million tons yearly), coinciding with the peak of PL-480 sales to Poland and Yugoslavia. This proportion dropped to 15 percent in 1966-70 (1.1 million tons yearly). When Poland lost its eligibility in 1964 as a recipient of PL-480 grain shipments, its grain purchases from the United States dropped from \$70 million in 1964 to slightly more than \$2 million in 1965; when Yugoslavia lost it in 1966, its imports of U.S. grain declined from \$66 million in that year to \$21 million in 1967.

The decrease in grain purchases from the United States was offset by increased imports from the Soviet Union on traditional terms, as well as from EC countries on short- and medium-term credit arrangements. The EC sales probably included some transshipments of grains of U.S. origin. Other sources of grain, amounting to 39 percent of total grain imports in 1966-70, included Canada, Latin American countries, the Mid-East, and the Far East, the last two areas principally supplying rice.

The EC countries are the most important recipients of East European grain exports, taking 30 percent of the total in 1966-70. These exports have been increasing, while exports to the Soviet Union, as well as intraregional exports, have declined considerably. Exports to unidentified destinations—mainly West European countries outside the EC and Mid-East countries—have expanded most.

Though net imports of oilseeds and oilseed feed products into Eastern Europe increased very rapidly during 1956-70, imports of oilseeds alone declined from 586,000 tons annually in 1956-60 to 462,000 tons in 1966-70, while exports increased from 61,000 to 372,000 tons. The principal and growing sources of oilseeds for Eastern Europe are the Soviet Union and the United States, which in 1966-70 supplied 37 and 25 percent of the total, respectively. During those 5 years, the United States was the only soybean

Table 47--Direction of trade in grains, oilseeds, oil meal and cake, live animals, and meats, Eastern Europe, averages 1956-60, 1961-65, and 1966-70

Origin and destination	: Unit	:	Exports		:	Imports	
by commodities	:	1956-60	<u>1</u> / 1961 - 65	1966-70	1956-60	1/: 1961-65	1966-70
rains:	:	:			:		
Total	:1.000 M.T.	: 1,311	1,749	3,275	: 6,991	8,778	7,387
Intraregional	,	: 10	7	2,217	· 0,391	0,110	1,001
USSR		: 8	9	4	: 42	31	37
EC		: 31	38	30	: 1	5	8
USA	: do.	:			: 17	22	15
Canada	: do.	:			: 3	9	3
Other		: 51	46	64	: 35	32	36
ilseeds:	:	:			:		
Total	:1.000 M.T.	: 61	137	372	: 586	363	462
Intraregional		$\frac{1}{7}$	-21	215	: 700	202	402
USSR		:			: 4	27	37
EC		: 13	47	63	:	- 1	21
USA		:				9	25
Other		: 80	53	37	: 87	64	38
il meal and cake:	:	•			:		
Total	• 1 000 M T	· : 2/20	2/41	E7	. 00	67.2	7 257
Intraregional		. 2/20 NA	2/41 NA	<u>51</u>	: 99	613	1,351
USSR		: NA	NA NA	0	:	3	3
EC		: NA	NA	9	: 13	8	22
USA		: NA	NA	9	·	11	17
India		· NA	NA		: 19	22	29
Other		· NA	NA NA	83	: 65	56	29
001101	. 40.	. NA	NA	03	. 0))0	29
ivestock:	•						
Total <u>3</u> /	• •1 ооо м.т.	: 80	64	185	: 14	18	17
Intraregional		: 10	13	5	50	<u> </u>	47
USSR		: 5	4	í	:		
EC		: 59	54	81	: 21	11	35
(Italy)		: (24)	(36)	(68)	: ()	()	()
Other Europe		: 25	21	9	: 29	22	18
Other	do.	: 1	8),	:	6	
	:				:		
eats:	:	:			:		
Total	:1,000 M.T.	257	463	543	: 242	272	298
Intraregional		25	20	12	: 35	35	22
USSR		: 8	11	. 6	: 32	30	29
EC		: 24	26	41	: 6	8	6
(Italy)	do.	: (6)	(13)	(23)	: ()	()	()
UK	do.	: 28	23	17	:		
Other Europe		: 5	9	14	: 7	13	12
USA		: 5	5	6	:		
China	do.	:	w		: 14	5	14
Argentina					:	1,	6
Uruguay		:			:	1	3
Other	do.	5	6	14	: 6	14	7
	:				:		

^{-- =} Less than 0.5 percent.

^{1/} Data for this period are insufficient. Consequently, percentage shares may be of doubtful validity.

^{2/} Direction of trade not given in national statistics.
3/ Carcass-weight equivalent; horses excluded.

Sources: $(\underline{6}, \underline{9}, \underline{13}, \underline{18}, \underline{19}, \underline{28}, \underline{37}, \underline{74}, \underline{81})$.

supplier to the region. Imports from other countries include sunflowerseed, linseed, cottonseed, and groundnuts. Oilseed exports from the region are largely sunflowerseeds from the southern countries. The EC is the principal and expanding importer, taking 63 percent of East European oilseed exports in 1966-70.

Of all agricultural imports, imports of oilseed cake and meal have grown most rapidly, from an annual average of 99,000 tons in 1956-60 to over 1.3 million in 1966-70. Peanut meal from India has maintained its highest share, accounting for 29 percent of all cake and meal imports in 1966-70. The EC's share, made up largely of soybean meal processed from U.S. soybeans, amounted to 22 percent in 1966-70. U.S. shipments--all soybean meal--accounted for 17 percent. All three principal suppliers expanded greatly their sales volume as well as their shares.

Exports of live animals from Eastern Europe expanded from 80,000 tons to 185,000 tons in carcass weight equivalent between 1956-60 and 1966-70. Most of these exports were to the EC, where Italy is the principal buyer of cattle and sheep from the southern countries. The volume of intraregional sales as well as sales to other West European markets has remained about stable, though the proportions of both fell.

Exports of meats from the region more than doubled, rising from 257,000 tons a year in 1956-60 to 543,000 in 1966-70. The largest and growing proportion of these exports went to the EC, where Italy is the principal buyer. Exports to the United Kingdom declined, but those to other West European countries increased sizably. The United States was a growing although small market, increasing its meat imports from the region from 14,000 tons to 30,000 between the two periods.

The volume of imports of meats into Eastern Europe has changed little, increasing from 242,000 tons annually in 1956-60 to 298,000 tons in 1966-70. Most of these imports represent intraregional transactions and purchases from the Soviet Union and China.

Trade Potential Through 1980

Grain and Oilseeds

Consumption of grain in Eastern Europe will increase considerably by 1980. Total consumption is projected at 97 million tons, as opposed to about 75 million tons annually during 1966-70 (table 48). Most of the increase will result from increased requirements for livestock feed.

Consistent with the trend in recent years, however, grain production is projected to increase faster than grain consumption. As a result, Eastern Europe is projected to slightly decrease its imports of grains from the annual average of 4.4 million tons in 1966-70 to about 3.0 million tons in 1980. The northern countries will import about 5.7 million tons of grain in 1980, a decrease from about 6 million tons annually in 1966-70; but the southern countries will increase their exports from 1.6 to 2.7 million tons during this time.

1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980

Item	. Czecho- East slovakia Germany	East Germany	: : Poland :	Northern: countries:Bulgaria	: Bulgaria :	Hungary	: Romania	Yugo- slavia	Southern: countries	Total Eastern Europe
	••									
	••				1,000 me	1,000 metric tons				
	••									
Production:	••									
1956-60	: 5,339	6,042	14,035	25,416	4,382	6,429	9,186	9,315	29,312	54,728
1961–65	: 5,498	5,845	15,000	26,343	4,728	6,682	10,887	10,337	32,634	58,977
1966-70	: 6,967	6,673	16,795	30,435	6,246	8,169	12,699	12,918	40,032	70,467
1975	: 8,578	8,230	20,007	36,815	7,606	9,738	15,112	15,381	47,837	84,652
1980	: 9,687	9,112	22,626	41,426	8,361	10,920	16,589	16,989	52,859	94,285
	••									
	••									
Consumption:	••									
1956-60	: 6,995	8,010	15,630	30,635	4,425	6,685	8,963	9,831	29,908	60,539
1961–65	: 7,387	7,753	17,663	32,803	4,983	7,215	9,956	10,853	33,395	66,198
1966-70	: 8,731	8,893	18,836	36,460	6,036	8,146	11,338	12,897	38,417	74,877
1975	: 10,284	606,6	23,208	43,401	7,015	6,963	13,355	14,860	45,192	88,593
1980	••	10,800	24,918	47,081	7,760	10,916	15,347	16,161	50,184	97,265
	••									
	••									
Net Trade:	••	,	1	1		,		1	1	1
1956-60	: -1,656	-1,968	-1,595	-5,219	-43	-256	223	-516	-592	-5,811
1961–65	: -1,889	-1,908	-2,663	-6,460	-255	-533	931	-904	-761	-7,221
1966-70	: -1,764	-2,220	-2,041	-6,025	210	23	1,361	21	1,615	-4,410
1975		-1,679	-3,201	-6,586	591	-225	1,757	521	2,645	-3,941
1980	: -1,675	-1,688	-2,292	-5,655	601	7	1,242	828	2,675	-2,980
	••									

1/ No sign = net exports; a minus sign (-) = net imports.

Sources: Tables 19 and 39.

A major reason for the projected lower grain consumption growth rate is an expected increased rate of substitution of oilmeals for grains in livestock feeds. During 1966-70, protein meal accounted for 7.4 percent of total feed concentrate consumption. This percentage is projected to increase to 10.1 percent by 1980, resulting in protein meal consumption of almost 7 million tons. More than 83 percent of this protein meal will be of vegetable origin (see tables 22 and 23).

Eastern Europe has been an important producer of oilseeds. In 1966-70, annual oilseed production reached close to 2.7 million tons, of which 27 percent was Romanian sunflowerseed and 20 percent Polish rapeseed (table 42). However, domestic consumption has outrun production, necessitating substantial imports, mainly of meal (table 49). Hence, though plans call for increased oilseed production and increased investment in crushing facilities, domestic supply will not keep up with increasing livestock requirements. Assuming all future protein feed imports are meal (in recent years East European countries have trended toward meal imports rather than seed imports), 1980 oilmeal import requirements are projected at close to 3.6 million tons for the region. This is an increase of 158 percent over the annual average import requirement during 1966-70. The only country that will be self-sufficient in oilmeal in 1980 is Romania, which may even have an exportable surplus, provided it can expand its oil crushing facilities.

Although analyses of protein meals and grains were integrated in this study, it seems unrealistic that in 1980 the southern countries will import over 1 million tons of oilmeal concurrent with an exportable grain surplus of 2.7 million tons. In face of the foreign exchange situation of the countries involved, the technological level of their livestock industry, and recent trends, it is probable that there will be some substitution of grain area for area devoted to oilseed production and expansion of oilseed processing facilities, as well as more grain than projected being fed to animals. Hence, grain exports and oilseed feed imports may be somewhat smaller than projected. Nevertheless, this will not change the direction of future East European feed requirements. During the 1970's Eastern Europe is projected to be a contracting market for grains, although the northern countries will continue to be sizable importers. On the other hand, with the sole exception of Romania, Eastern Europe should be an expanding market for high-energy protein meals.

Livestock Products

East European meat exports in 1980 are projected to be above those of 1966-70. Production of meat will be 8.7 million tons, up from 5.9 million tons during 1966-70; consumption is projected to be 8.1 million tons, up from 5.5 million tons. Thus, the net exportable surplus of meat is projected to increase from 417,000 tons a year in 1966-70 to 684,000 tons in 1980 (table 50). Projected increases in consumption of livestock products are generally matched by projected increased level of production, so that the effect on net trade will be only moderate. Increased livestock product exports will be required to produce foreign exchange needed for feed and other essential imports, but production will be expanded primarily to match increasing levels of consumer demand.

: Total : Eastern : Europe		706 981 1,351 1,804 2,206	1,094 1,706 2,745 4,415 5,798	-388 -725 1,394 -2,611 -3,592
Southern countries		472 610 855 1,208 1,548	495 848 1,253 1,955 2,602	-23 -238 -398 -747 -1,054
Yugo- slavia		64 124 173 254 321	74 212 250 466 629	-10 -88 -77 -212 -308
: : Romania :		239 311 454 677 926	223 289 450 607 806	16 22 4 70 120
: Hungary	1,000 metric tons	60 58 60 61	93 213 337 571 749	-33 -155 -277 -510 -688
Northern : Bulgaria : Hungary : countries	1,000 me	109 117 168 216 240	105 134 216 311 418	4 -17 -48 -95 -178
Northern		234 371 496 596 658	599 858 1,492 2,460 3,196	-365 -487 -996 1,864 2,538
: : Poland :		96 232 332 429 485	192 364 581 1,081 1,425	-96 -132 -249 -652 -940
East Germany		97 97 119 120 123	255 297 573 848 1,088	-158 -200 -454 -728 -965
Czecho- slovakia		. 41 . 42 . 45 . 47 . 50	152 197 338 531 683	-111 -155 -293 -484 -633
Item		Production: 1956-60 1961-65 1966-70 1975	Consumption: 1956-60 1961-65 1966-70	Net trade: 1/ 1956-60 1961-65 1966-70 1975

1/ Assumes all trade in 1975 and 1980 is meal (no trade in oilseeds). 2/ No sign = net exports; a minus sign (-) = net imports.

Sources: Tables 22, 42 and Appendix table 3.

Table 50--Eastern Europe's production, consumption, and net trade of meats, $\frac{1}{2}$ averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980

ıtem	Czecho- slovakia	East Germany	: Poland	Northern	h: Bulgaria :	Hungary	Romania	Yugo- slavia	Southern	Total Eastern
	•• ••				1,000 metric tons	ric tons				
	••									
Production:	••									
1956-60	: 588	792	1,250	2,630	214	458	455	482	1,609	4,239
1961-65	: 667	863	1,436	2,966	288	563	509	209	1,967	4,933
1966-70	: 786	1,068	1,654	3,508	375	649	658	719	2,401	5,909
1975	: 995	1,255	2,089	4,339	486	880	870	941	3,177	7,516
1980	: 1,137	1,418	2,418	4,973	580	995	1,089	1,105	3,769	8,742
	••									
Consumption:	••									
1956-60	749 :	878	1,154	2,706	196	398	422	416	1,432	4,138
1961-65	: 739	996	1,277	2,982	262	475	457	465	1,659	4,641
1966-70	: 868	1,077	1,542	3,487	321	515	269	009	2,005	5,492
1975	: 1,084	1,250	1,901	4,235	443	645	794	751	2,633	6,868
1980	: 1,214	1,360	2,291	4,865	529	745	1,021	868	3,193	8,058
•	••									
Net trade $\frac{2}{}$:	•									
1956-60	98-	-86	96	9/-	18	09	33	99	177	101
1961–65	: -72	-103	159	-16	26	88	52	142	308	292
1966-70	: -82	6-	112	21	54	134	89	119	396	417
1975	: -89	5	188	104	43	235	92	190	244	648
1980	: -77	58	127	108	51	250	89	207	576	684
	••									
1/ Beef and veal, pork, mutton	al, pork,	mutton and	1 Lamb, and	d poultry.						

^{2/} Minor discrepancies between these balances and net trade numbers in table 46 and Appendix table 13 are due to roundings.

Note: No sign means net exports; a minus sign indicates net imports.

Sources: Tables 18 and 38 and Appendix table 4.

However, consumption of meats was projected on the assumption that high retail meat subsidies, prevalent in the region up to now, will be maintained through 1980. There are indications that East European governments are planning to lower considerably these subsidies, which would cause an increase in consumer meat prices. Should this happen, the present high rate of growth of meat consumption will slow down and meat exports will be larger than projected. It is also possible that the southern countries of the region may choose to expand livestock production faster than projected, using for this purpose all their emerging grain surplus. The result would also be greater than projected meat exports. However, the expanded production would have to be in beef, as future export markets for pork and poultry are expected to be limited.

In the case of the other two livestock products analyzed in the study—dairy products and eggs—the region is expected to expand production to the level of self-sufficiency.

Prospects for U.S. Feed Trade With Eastern Europe

In 1971, total U.S. agricultural imports from Eastern Europe were valued at \$90.9 million, while U.S. agricultural exports to the region were valued at \$247.8 million (16). In nonagricultural products, the East European countries—particularly the northern countries and Yugoslavia—also carry a substantial trade deficit with the United States. It is unlikely, however, that they will allow it to worsen much.

Generally, trade between the United States and Eastern Europe has been limited by U.S. Government controls, discriminatory tariffs on imports from most communist countries, U.S. reluctance to grant favorable credit terms, and certain U.S. shipping requirements.

In 1951, the United States withdrew "most favored nation" (MFN) tariff treatment from all of Eastern Europe except Yugoslavia, so that these countries have faced the higher duties established by the Tariff Act of 1930 and have not benefited from reductions negotiated in the GATT (96). The U.S. move led to some reciprocity on the part of East European countries in the form of occasional higher tariffs on U.S. commodities, particularly oilseeds and oilseed products. However, Poland regained MFN status in 1960 and Romania is being considered for the same treatment, with Hungary very likely following next.

U.S. Government controls on exports to communist countries of goods considered of strategic importance were considerably relaxed in 1966 so that nearly all agricultural products could be exported under general licenses. Exceptions were wheat and feed grains, which still required validated export licenses for shipment, except to Poland and Romania. This requirement was finally removed in June 1971.

At the same time, the United States removed its requirements that 50 percent of grain shipped to East Germany, Czechoslovakia, Hungary, and Bulgaria

be carried in U.S. flag vessels <u>24</u>/ Since U.S. shipping rates can be as much as \$10 to \$13 per ton higher than those of foreign carriers, the requirement placed U.S. grains at a price disadvantage. Its removal makes U.S. grains more competitive in East European markets.

There has also been some liberalization of the U.S. Export-Import Bank's lending authority with regard to its participation in normal export financing to East European countries. Such participation had been prohibited by an act of 1968 and, without the Bank's guarantee, even short-term private commercial credits to these countries became difficult to obtain. However, the Export Expansion Act of August 17, 1971 authorized the Bank to guarantee commercial credits extended to East European countries, provided that the President determines this to be in the national interest. So far, however, this privilege has been extended only to Romania and Poland.

Finally, following a pattern established earlier in Moscow, the United States and Poland agreed on June 1, 1972, to establish a joint commission to expand trade through increased contacts on governmental and business levels. And on September 11 of the same year, the two countries signed another agreement authorizing the expansion of commercial facilities in both countries, providing for third-country arbitration of trade disputes, and allowing the establishment of joint ventures in Poland. However, any U.S.-Polish trade talks are likely to center on purchase of technology, licenses, and capital goods, most of which the United States has denied to Poland and other East European countries for strategic reasons.

Thus, continuing detente is characterizing relations between the United States and Eastern Europe. The mechanisms for agricultural trade are not likely to be greatly affected on either side by future negotiations but rather by changes that might occur in U.S. trade policy at the legislative level. Also, the hard-currency-deficit countries of Eastern Europe would like to expand exports of such commodities as textiles, chemicals, steel products, tools, glass, and rolling stock, in addition to livestock products, and will no doubt wish to offset future imports of livestock feeds with exports of these products.

Prospects for U.S. grain exports to Eastern Europe in the near future will be strongly influenced by price competition in international markets and the availability of credit. The peak wheat shipments of the mid-1960's under PL- 480, which later dwindled to the comparatively low levels of today, demonstrate this fact. In the longer run, it appears that despite the projected decreasing import demand for grains in Eastern Europe, the United States may actually increase its grain sales to the region because of continued strong demand in the northern countries, grain shortages in the Soviet Union—their traditional supplier—and improved trade relations.

^{24/} Poland, Romania, and Yugoslavia were already excluded from the requirement. The 50-percent restriction related only to wheat; feed grains were allowed in foreign vessels if at least half was unloaded in Western or Yugoslav ports.

The outlook for U.S. exports of oilseeds and oilseed products, more specifically soybean meal, is excellent. East European imports of U.S. soybeans and soybean meal expanded steadily during the 1960's. Moreover, the United States, which accounted for 73 percent of 1971 world soybean production, is geared toward supplying the needs of a large foreign market. U.S. exports of soybeans and products were worth more than \$2 billion in 1971, the first time any commodity has exceeded this level.

U.S. exports of prepared feeds to the region have been sporadic, and have centered mostly on poultry feeds for Hungary and Yugoslavia. Future U.S. success in developing export markets and promoting increased home consumption of poultry in Eastern Europe will determine whether the region will increase its imports of these relatively high-priced livestock inputs.

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APPENDIX

METHODOLOGICAL NOTES AND SUPPORTING TABLES

Consumption Projections

Grain Balances

Because official data relating to the various uses of grains in Eastern Europe were unavailable, we estimated utilization of grain by calculating grain balances for each country. As a first step in this calculation, we added domestic grain production and net grain trade to arrive at total grain availability. This total availability was then partitioned into five uses: food, feed, industrial, seed, and waste. Through the use of either (1) official total flour or grain consumption data or (2) per capita flour or grain consumption data, the amount of grain consumed as food was derived. Flour was converted to grain equivalent based on estimated conversion factors (app. table 1). Seed grain was estimated from seeding rates (app. table 2) and planted area. Industrial use was based on beer, liquor, and grain starch consumption. Waste was assumed to be 5 percent of total domestic production. Subtraction of these four uses from total availability resulted in an estimate of grain used for feed. For East Germany, some adjustment for stock carryover was made.

Protein Meal Balances

As was the case with grain, official data dealing with consumption of protein meals were unavailable. Consumption was therefore estimated in the following manner. Domestic oilseed production and oilseed imports were converted to oilmeal (see (48) for meal extraction factors). Net trade of oilmeal was added to domestically produced oilmeal to arrive at an estimate of total oilmeal availability. Fishmeal production and imports were added to determine total protein meal availability. Finally, to project oilmeal and fishmeal requirements through 1980, oilmeal extraction factors and fishmeal as a percentage of total protein meal were estimated (app. table 3).

Meat Balances

Official data relating meat production to consumption are sketchy. We estimated supply and utilization by calculating meat balances for each country. The official liveweight production series were converted to dressed carcassweight equivalents (app. table 4). Net exports of live animals for slaughter (which were included in the live-weight production series) and of meat were subtracted from domestically produced meat to arrive at total meat availability. Per capita domestic meat consumption was derived by dividing total meat availability by midyear population. Since most countries publish per capita consumption data, the calculated statistics were compared with official data. Meat in this study is beef, pork, mutton, and poultry--excluding fats and offals.

Appendix table 1--Flour-to-grain conversion factors used to estimate grain consumption in Eastern Europe

Grain :	Czecho- slovakia	East Germany	: Poland :	: Bulgaria :	Hungary	: Romania :	Yugo- slavia
:				Percent	-		
Wheat	60 60 76	77 65 65 82 65	72 60 50 70 <u>1</u> /	78 65 75 78 70	75 65 <u>1</u> / 75 <u>1</u> /	72 65 75 75 75	77 86 50 77 75

^{1/} Not applicable.

Source: ERS estimate based on (27).

Appendix table 2--Seeding rates for grains in Eastern Europe, average 1956-70

Grain :	Czecho- slovakia	East Germany	Poland :	Bulgaria	: : Hungary :	: Romania :	Yugo- slavia
:			Kilo	grams/hecta	are		
Wheat	-	190 150	190 175	195 175	<u>i</u> /180	200 175	<u>2</u> /200 130
Barley: Oats: Rye:	150	150 150	185 185	175 175	160 180	180	140
Corn <u>3</u> /:		45	35	50	35	40	35

^{1/ 240} kgs./hectare from 1965-70.

Source: ERS estimates based on (27).

^{2/ 1956-58, 180; 1959-62, 200; 1963-70, 220.} 3/ Average seeding rate--corn for grain and silage.

Appendix table 3--0ilmeal extraction factors and fishmeal as a percentage of all protein meal, Eastern Europe, average 1966-70 and projections to 1975 and 1980

Country	Average oilmeal extraction	•	a percentage rotein meal
<u> </u>	factor	1966-70	1975 and 1980
		Percent	
Czechoslovakia. : East Germany. : Poland. : :	56 52 60	19 17 17	20 20 20
Bulgaria. : Hungary. : Romania. : Yugoslavia. :	37 47 55 54	6 12 1 17	10 15 1 ' 20

Sources: For oilmeal extraction factors $(\underline{27})$. Other data are ERS estimates, based on $(\underline{6}, \underline{19}, \underline{37}, \underline{52}, \underline{58}, \underline{73}, \underline{74}, \underline{81})$.

Appendix table 4--Estimated average live weight per animal and conversion factors from live weight to dressed carcass weight, Eastern Europe, averages 1956-60, 1961-65, and 1966-70 and projections to 1975 and 1980 1/

Commodity	: Av	erage live w			on factors dressed ca			t to
and country	1956-60	1961-65	1966-70	1956-60			: 1975	1980
	:	Kilograms -			<u>Pe</u>	rcent		
Cattle:	:							
Czechoslovakia	: 392	403	445	52.0	52.0	52.0	54.0	54.5
East Germany	: 345	325	381	55.0	54.0	53.0	54.0	54.5
Poland	: 339	339	350	49.0	49.0	49.0	51.0	51.5
Bulgaria	: 392	286	413	46.0	48.0	52.0	52.0	52.5
Hungary	: 542	473	495	50.0	53.0	53.0	55.0	55.5
Romania	: 392	386	413	50.0	51.0	51.0	51.0	51.0
Yugoslavia	: 392	386	413	49.0	47.0	47.0	52.0	52.5
Hogs:	:							
Czechoslovakia	: 109	110	115	64.0	64.0	64.0	65.0	65.5
East Germany	: 121	117	116	65.0	65.0	64.0	65.0	65.5
Poland	: 120	115	114	61.0	61.0	61.0	61.0	61.0
Bulgaria	: 109	114	116	50.0	50.0	50.0	53.0	55.0
-	: 121	119	120	39.0	43.0	43.0	47.0	48.0
• .	: 109	114	116	48.0	48.0	48.0	48.0	48.0
Yugoslavia	: 109	114	116	45.0	45.0	46.0	49.5	50.0
Choon:	:							
Sheep: Czechoslovakia	· : 36	36	40	50.0	50.0	50.0	50.0	50.0
East Germany	: 36	36	40	50.0	50.0	50.0	50.0	50.0
Poland	: 38	35	40	45.0	46.0	46.0	50.0	50.0
	7.2	3 <i>3</i> 29	30	47.0	48.0	49.0	50.0	50.0
	: 28 : 28	29	30	48.0	48.0	46.0	48.0	48.5
Hungary Romania	: 28	29	30	52.0	52.0	52.0	52.0	52.0
		29	20	50.0	44.0	45.0	47.5	48.0
Yugoslavia	: 21	21	20	30.0	44.0	43.0	47.5	40.0
Poultry:	:							
•	: NA	NA	NA	72.0	72.0	72.0	72.9	72.0
East Germany	: NA	NA	NA	72.0	72.0	72.0	72.0	72.0
Poland	: NA	NA	NA	60.0	63.0	64.0	72.0	72.0
Bulgaria	: NA	NA	NA	70.0	70.0	70.0	72.0	72.0
	: NA	NA	NA	65.0	70.0	70.0	72.0	72.0
Romania	: NA	NA	NA	72.0	72.0	72.0	72.0	72.0
Yugoslavia	: NA	NA	NA	78.0	80.0	74.0	72.0	72.0
	:							

Live-weight to carcass-weight conversion factor applied to the total live-weight production.

Sources: (99, 142, 218, 339, 400, 516, 623, 702).

^{1/} Factors are estimates based on domestic slaughter weights published in FAO production year-books and in statistical publications of the countries.

Income Elasticities

Where income elasticities of demand were calculated by ERS, the following formula was used:

$$C_1 = C_0 + C_0 (\triangle Y \cdot E)$$

Where: C = per capita consumption

△Y = percentage change in per capita income

E = income elasticity

0 = base year

1 = latest year.

For example, in Bulgaria, per capita egg consumption was 4.36 kilograms in 1956 and 7.24 kilograms in 1969. Over this period, per capita income increased 177 percent. The calculations are as follows:

$$7.24 = 4.36 + 4.36$$
 (1.77 E)

7.24-4.36 = 7.72 E

E = .37.

Use of these income elasticities with projected income growth resulted in projected 1975 and 1980 per capita consumption levels. Total consumption levels were subsequently derived from estimates of total population and per capita consumption levels.

Production Patterns and Projections

Livestock Projections

For studying the relationship between livestock production and feed requirements, the most relevant production statistics of the livestock sector were those pertaining to livestock product output. Cattle, hogs, sheep, and poultry were represented by annual live-weight production of beef and veal, pork, and poultry; dairy cows and hens were represented by milk and egg output. Livestock numbers were used for horses and sheep, however, since horsemeat and mutton production alone were not adequate measures of the feed requirements aspects of these livestock categories.

The definitions for live-weight meat production and egg output were consistent among countries except that official Yugoslav milk production statistics were not comparable with those of other East European countries in that they excluded milk sucked by calves. Thus an arbitrary 26 percent was added to the Yugoslav series on milk production for comparability.

To project East European livestock product output, we initially tested correlation analyses between livestock product output and prices and product/grain price ratios. Projections from FAO (21) and OECD (47) publications were examined, but in most instances they appeared to be low in light of achievements in the East European livestock sectors during 1969-71. Linear

and logarithmic time trends of 1955-70 or 1960-70 data were chosen as the most adequate bases for most projections in this study (app. tables 4 and 5). Official plans and statistical tests served as guidelines in choosing the "best" projections.

In some cases, official plans took precedence over linear projections. Official plans which showed a slower growth rate than the extrapolation of past trends were used for projecting Czechoslovak meat, milk, and egg production; East German egg production; and Bulgarian milk production (18, 35, 63, 64, 81, 85).

The reason for using official plans for Czechoslovakia, for example, is that cow numbers there, which represent the breeding stock base for future beef and milk production have shown inadequate growth and thus indicate limited growth in production of livestock products in the near future. An extrapolation of linear trends would overestimate the production of these commodities.

Recent increases in Hungarian and Polish pork production have been so great that the 1975 plans of these countries were nearly met in the early 1970's. To accommodate these developments in Hungary, the country's 1975 pork production plan was adopted as this study's projection, and the 1976-80 growth rate was projected at a rate derived from the projection for 1971-75. A curvilinear function was used to explain the growth of Poland's hog production. Romanian mutton and Hungarian egg output are also slated for a faster than linear growth. However, growth rates for these two commodities were projected at levels slightly less than officially planned since the planned increases appear too optimistic.

Grain Production Projections

Grain production projections were obtained from the separate projections of the area and yield components. Two time periods—1955—70 and 1960—70—were selected to allow derivation of trends originating in a longer historical period and in the post—collectivization period. The latter period—during which fewer disruptive administrative changes occurred—generally gave a more statistically satisfactory data base.

Area projections are linear extrapolations of historical trends, with country plans serving as guidelines (app. table 7). In Bulgaria and Czechoslovakia, the limited supply of arable land is expected to curtail recent grain area expansion. The official Bulgarian plan, reflecting this restriction, was the basis for the 1975 grain area projection for this study. Czechoslovak plans also reflect land limitation in expanding grain areas. In this study, the recent uptrend in grain area in Eastern Europe was extended through 1975, to the maximum level obtained during 1955-70. During 1976-80, grain area is projected to decline by the same proportion as the estimated decline in total arable land. As in the past the fall in total area sown to grain will affect chiefly oats and rye. Corn, wheat, and barley area, which are in an upswing, will continue to expand.

Appendix table 5--Equations used to project Eastern Europe's production of livestock products

Dependent : variable :	Time period	: R ²	Standard error	Equation
EG B&V P B&V B B&V R B&V R B&V EG PR P PR B PR R PR P M&L B M&L EG PL P PL B PL R PL R PL EG M	1955-70 1960-70 1960-70 1955-70 1955-70 1960-70 1960-70 1960-70 1955-70 1955-70 1960-70 1960-70 1960-70 1960-70	. 96 . 95 . 80 . 58 . 36 . 57 . 54 . 37 . 79 . 21 . 81 . 96 . 99 . 83 . 96 . 90 . 82	2.62 47.62 16.14 22.90 469.32 8.36 3023.14 27.6 366.02 5.01 48.59 4.51 1.68 10.93 8.62 372.418 3.46	EGB&V = -50.1 + 2.58 T PB&V = -84681.0 + 43.54 T BB&V = -17974 + 9.2 T HB&V = -14743 + 7.64 T log RB&V = -1493 + 113.97 T EGPR = -37.2 + 1.94 T log PPR = -27586 + 737.52 T BPR = -11665 + 6.1 T log RPR = -8464.9 + 232.28 T PM&L = 1492.8 - 74 T BM&L = -55185 + 28.4 T EGPL = -9162 + 470.9 T PPL = 55.9 + .03 log T BPL = -13582 + 6.9 T HPL = -23176 + 11.9 T log RPL = -6538.35 + 262.51 T EGM = -2912.7 + 151.5 T
R M: P E: H E:	1955-70	.58 .89 .93	262.16 .32 122.59	RM = -168999 + 87.64 T PE = -353.2 + 18 T HE = -252422 + 129.6 T

C = Czechoslovakia

EG = East Germany

P = Poland

R = Romania

B = Bulgaria

H = Hungary

Y = Yugoslavia

B&V = Beef and veal

PR = Pork

M&L = Mutton and lamb

PL = Poultry

M = Milk

E = Eggs

T = Time

Appendix table 6--Equations used to project horse and sheep numbers in Eastern Europe

Dependent : variable :	Time period	R ²	Standard error	Equation
C HO	1955-70 1955-70 1955-70 1955-70 1955-70 1955-70 1955-70	.92 .84 .95 .73 .91 .31 .75 .55	42.54 79.52 20.82 128.0 24.93 144.98 184.4 69.17 199.21 788.89 49.79	CHO = 642.8 + 417.38 LIT HHO = 873.6 + 525.52 LIT BHO = 521.7 + 270.55 LIT RHO = 139.3 + 595.72 LIT YHO = 132.9 - 17.07 T CS = 6618.2 + 381.73 IT PS = 3619.3 + 904.88 LIT BS = 1000.1 - 302.07 IT HS = 2358.9 - 933.04 IT RS = 9496.3 - 348.66 LIT YS = 1141.2 - 12.89 T

C = Czechoslovakia

H = Hungary

B = Bulgaria

R = Romania

P = Poland

Y = Yugoslavia

HO = Horses

S = Sheep

LIT = Log inverse time

T = Time

IT = Inverse time

Dependent variable	Time period	R ²	: : Standard : error :	: : Equation :
C WWY EG WWY P WWY H WWY Y WWY EG SWY	: 1960-70 : 1960-70 : 1960-70 : 1955-70 : 1955-70	.84 .62 .97 .74 .72	1.39 2.61 .49 1.44 2.53 1.72	CWWY = 43.8 + 169 N26 SMA + .01 PM EGWWY = -7.17 + 27.4 PL14 PA PWWY = -1672 + .86 T10 SMA + .07 SMJ + .02 SMØ HWWY = -1331 + .69 T YWWY = -1588 + 8.2 T EGSWY = -23.55 + .13 PL04 PA
P SWY C WBY EG WBY P WBY EG SBY C CY C RY	: 1960-70 : 1960-70 : 1960-70 : 1955-70 : 1960-70 : 1960-70	.84 .61 .11 .85 .44 .91	1.02 2.43 3.61 1.03 3.15 2.12	PSWY = -1312.9 + .68 T09 SMA + .06 SMJ CWBY = 22.3 + .165 N052 PA EGWBY = -691.0 + .37 T PWBY = -1912.7 + .98 T08 SMA + .13 SMJ + .04 SMØ EGSBY = 28.0 + .14 PL06 PA07 PM CCY = 28.1 + .30 N25 SMM + .12 SMJ + .04 PJ CRY = 21.1 + .065 N03 PA
P RY C OY EG OY P OY R TGA H TGP Y TGP	: 1960-70 : 1960-70 : 1960-70 : 1960-70 : 1960-70 : 1960-70	.70 .91 .52 .80 .58 .61 .63	1.44 .56 1.56 1.33 1.59 200.91 6.38 14.82	EGRY = 8.79 + log 12.27 PL106 PA005 PJ 036 SMS PRY = -1013.0 + .52 T + .01 SMØ09 PA + .07 PJ COY = 22.1 + .057 N057 PA EGOY = -2.76 + log 22.19 PL113 PA042 PJ POY = -1203.7 + .63 T08 SMA + .07 SMJ RTGA = 148336 - 72.09 T HTGP = -457 + 236.4 T YTGP = -7373 + 381.1 T

```
EG = East Germany
P = Poland
B = Bulgaria
H = Hungary
R = Romania
Y = Yugoslavia
```

C = Czechoslovakia

```
WWY = Winter wheat yield

SWY = Spring wheat yield

WBY = Winter barley yield

SBY = Spring barley yield

CY = Corn yield

RY = Rye yield

OY = Oat yield

TGA = Total grain area

TGP = Total grain production
```

```
T = Time
SMA = Soil moisture April
SMJ = "
                    June
SMØ = "'-
                    October
SMM =
                    May
SMS = "
                    September
PM = Precipitation May
PA =
                   April
PJ =
                   June
PAP = Percent of norm--April
       precipitation
PL = Phosphate/hectare of arable
       1and
N = Nitrogen/hectare of arable
       1and
```

Price grain area relationships were tested with limited success. The price influence, which has been strengthened by East European economic reforms begun in the late 1960's, may affect grain production much more in the future than in the past.

In Hungary and Yugoslavia, linear trends and country plans were employed in <u>yield projections</u>. However, during 1971-75, Bulgarian wheat yields and Romanian coarse grain yields are planned to expand more rapidly than a linear trend would indicate. To take account of the effect of the tripling of fertilizer applications on Romanian grain production, the rate of growth applied to Romanian grain production was assumed to be the same as the projected growth in the already rapidly advancing Yugoslav production. The Romanian coarse grain yield projections were then derived as a residual. In Bulgaria, the projected wheat yield is expected to be between that of Czechoslovakia and of Hungary. Thus, the projected Bulgarian wheat yield was calculated as the average of the projected wheat yields of the two countries.

A function derived from multiple regression and correlation analysis was used in projecting grain yields in the northern countries (app. table 8). Initially, for each type of grain we tested various models, using the dependent variable of yield per hectare and independent variables of time, fertilizer use, price, and monthly weather data. Linear and logarithmic functions were employed.

For Czechoslovakia and East Germany, a model with the "best" fertilizer use (specified as number of kilograms of nitrogen, phosphate, or potash applied per hectare of arable land) and the "best" combination of monthly weather variables was used to explain variations in per hectare crop yields. Analogous "fertilizer-weather" combinations were tested for Poland, but statistical results were no better than those obtained from "time-weather" equations. A multiple regression model of the latter was used. For all three countries, the statistical fit from the multiple regressions with the above variables was superior to that from a time trend alone.

Yield projections were based on the combinations of variables showing the "best" statistical results, with future changes in weather and fertilizer use taken into consideration. Weather was projected as normal. In Czechoslovakia and East Germany, where a "best" fertilizer use variable was included, linear or semilogarithmic trend projections were used. Announced country plans on fertilizer production and use were given prominent consideration. If an official government plan called for a lower rate of fertilizer use than a linear projection suggested, the plan's rate was used.

An implicit restriction was that projected East European fertilizer use per hectares of arable land would not be higher than that in technologically advanced West Germany. Projected fertilizer use rates in the most advanced East European countries, however, did not exceed current West German usage.

Nongrain Feed Production Projections

Potatoes, fodder beets, corn for silage and green feed, sunflowerseed, rapeseed, perenniel grass for hay, annual grass for hay, permanent pasture,

R ²	.84 .61 .90 .52	.62 .67 .11 .44 .80	.97 .84 .85 .76 .58	
Equation :	8 + .169 N**257 PAP* + .014 PMP 3 + .165 N052 PAP 1 + .300 N**248 PMSM* + .117 PJSM + .036 PJUP 1 + .057 N057 PAP* 1 + .065 N**030 PAP*	-7.17 + 27.429 log P**143 AP* 23.44 + .129 P**043 AP -691.0 + .368 T 28.0 + .140 P**056 AP069 MP -2.76 + 22.187 log P**113 AP**042 JP 8.79 + 12.274 log P*106 AP*005 JP036S	1,671.8 + 866T**104A** + .073J** + .020 Ø** -1,312.9 + .684**096A* + 055J 1,912.7 + .980T**083A** + .131J* + .039 Ø* - 1,362.9 + .710T**108A* + .067J -1,203.7 + 625T**084A + .067J 1,012.9 + .523T**092AP** + .074JP** + .014Ø	AP = April precipitation. AP = April precipitation. MP = May precipitation. JUP = July precipitation. APP = April precipitation. PAP = Percent of norm— April precipitation. May precipitation. N = nitrogen/hectare of arable land. N = nitrogen/hectare of arable land.
Country and crop :	Czechoslovakia: Wheat Y = 43.8 + Y = 22.3 + Y = 22.3 + Y = 22.1 + Y = 21.1 + Y = 22.1 + Y = 22	East Germany: Winter wheat	inter wheat	<pre>% = 5-percent significance in the T-test. ** Y = yield. T = time. A = April soil moisture. J = June soil moisture. S = September soil moisture. DAP = PAP S = September soil moisture. PAP = Pe Ø = October soil moisture. PAP = Pe</pre>

and permanent meadows were selected as the nongrain feeds to be considered in projecting livestock production. The basis for their choice was the availability of consistent data on these feeds among the East European countries and their importance in East European livestock rations.

Projections of availability of feeds were mostly extensions of the 1955-70 and 1960-70 linear trends of area and production. Only sunflowerseed and rapeseed production trends were obtained from separate linear extrapolations of area and yield data. In many instances, projections were made on incomplete historical series.

For the most part, <u>area projections</u> were extensions of the following trend lines:

	Czechoslo- vakia	East Germany	Poland	Bulgaria	Hungary	Romania	Yugo- slavia
Potatoes	1955-70	1955-70	1966-70	1960-70	1955-70	1960-70	1/
Fodder beets	1955-70	1955-70	1955-70	1960-70	1/	1955-70	1955-70
Corn for silage and green feed	1960-70	<u>1</u> /	1960-70	1/	1960-70	1960-70	
Rapeseed	1960-70	1955-70	<u>1</u> /				
Sumflowerseed				<u>1</u> /	1/	1955-70	<u>1</u> /
Perenniel grass for hay	1955-70	1960-70	1955-70	1960-70	1955-70	1955-70	1960-70
Annual grass for hay	1960-70	1955-70	1/	1/	1960-70	1955-70	
Permanent meadow	1955-70	1960-70	1955-70	1960-70	1955-70	1955-70	<u>1</u> /
Permanent pasture	1960-70	1960-70	1/	1/	1955-70	1/	1955-70

¹/ Linear trend not used.

Some deviations had to be made from the standard approach. First, in some instances, the availability of arable and agricultural land put limitations on expansion of crop areas; in these cases, no further expansion was projected. Growth in Yugoslavia's potato, permanent pasture, and sunflowerseed areas was limited at the 1970 level, as was growth in Bulgaria's permanent pasture and sunflowerseed areas, Romania's permanent pasture area, and Poland's rapeseed and annual grass areas. Second, the rate of decrease to be applied to declining crops was taken into consideration. For example, it was assumed that a certain potato area would be maintained to provide for human consumption,

seed, and livestock feed. Declines in Bulgaria's potato and annual grass areas, Czechoslovakia's potato area, and Hungary's beet and sunflowerseed areas were assumed to be arrested in either 1970 or 1975. Third, where other crop areas showed no discernable trend, having fluctuated with the changing historical priorities among crops, growth patterns for a short period of years were used as a guide in projections. For the Bulgarian and East German corn for silage and green feed areas, 1966-70 growth patterns were used. Linear time trends were also employed for estimating the 1975 and 1980 production levels of potatoes, fodder beets, corn for silage and green feed, and hay from perenniel and annual grasses. Where area projections had been altered, production projections were also changed.

* * * * * * * * * *

The following pages contain supporting tables on agriculture in Eastern Europe.

Appendix table 9--Distribution of Eastern Europe's agricultural land by type of use, averages 1956-60, 1961-65, and 1966-70, and projections to 1975 and 1980

				:	:	: Av. annua	1 rates o 1966-70	
Country and land use	1956-60	1961-65	1966-70	1975	1980	: to :		: 1975-80
				:	<u>:</u>	: 1966-70 :		:
	: :	<u>1,000</u>) hectares	<u> </u>			Percent	
C≱echoslovakia:	•							
Agricultural land	7,358	7,219	7,118	6,953	6,838	-0.3	-0.3	-0.3
Arable land	5,423	5,406	5,354	5,283	5,233	-0.1	-0.2	-0.2
Grain		2,473	2,580	2,650	2,600	0	+0.4	-0.
Oilseeds $1/\dots$		45	44	42	41	+1.5	-0.7	-0.
Potatoes		504	376	231	230	-3.3	-4.8	0
Forages 2/	-	1,464	1,597	1,624	1,648	+0.3	+0.3	+0.
Other crops		920	757	736	714	+0.6	-0.4	-0.
Pasture		788	790	773	764	-0.6	-0.2	-0.
Meadows	: 1,092	1,025	975	897	841	-1.0	-1.1	~1.
East Germany:								
Agricultural land		6,397	6,328	6,223	6,157	-0.2	-0.2	-0.
Arable land		4,983	4,876	4,712	4,607	-0.5	-0.5	-0.
Grain	-	2,261	2,315	2,376	2,417	-0.5	+0.4	+0.
0ilseeds $\underline{1}/\dots$		113	111	98	91	-1.2	-1.6	-1.
Potatoes		728	665	589	531	-1.4	-1.5	-1.
Forages <u>2</u> /		985	1,051	980	949	+1.7	-1.3	-0.
Other crops		896	734	669	619	-1.7	-1.2	-1.
Pasture		528	592	681	743	+3.2	+2.0	+1.
Meadows	: 881	886	860	830	807	-0.2	-0.4	-0.
oland:	:							
Agricultural land		20,107	19,581	19,443	19,344	-0.4	-0.1	-0.
Arable land		15,917	15,360	15,213	15,108	-0.5	-0.1	-0.
Grain	*	8,694	8,455	8,510	8,532	-1.0	+0.1	0
Oilseeds $1/\dots$		224	279	300	300	+10.6	+1.1	0
Potatoes		2,823	2,729	2,616	2,526	-0.2	-0.6	-0.
Forages <u>2</u> /		1,941	2,081	2,346	2,537	+3.9	+1.8	+1.
Other crops	-	2,225	1,816	1,447	1,213	-2.6	-2.6	-3.
Pasture Meadows		1,772 2,419	1,683 2,538	1,705 2,525	1,720 2,516	-0.6 +0.6	+0.1 -0.1	+0. 0
neadows	: 2,350	2,419	2,550	2,323	2,510	+0.0	-0.1	U
Bulgaria:		F 70/	F 016	F 027	F 760	0 5	0.0	0
Agricultural land		5,724	5,916	5,827	5,769	0.5	-0.2	-0.
Arable land	,	4,565	4,552	4,477	4,432	0 ~1.5	-0.2 -0.2	-0. -0.
Grain		2,399	2,221	2,188	2,166	+2.6	0.2	-0.
Oilseeds 1/		260 41	273 32	275 22	275 20	-0.6	-3.9	-1.
Potatoes Forages 2/		685	657	720	770	+0.4	+1.4	-1. +1.
			1,369			+2.7	-1.0	-1.
Other crops		1,180 900	1,113	1,272	1,201		0	0
Pasture Meadows		259	251	1,110 240	1,105 232	+3.6 +0.3	-0.6	-0.
	:							
Hungary:	: ,	7				2 1	2 2	
Agricultural land		7,003	6,901	6,720	6,694	-0.4	-0.3	-0.
Arable land		5,632	5,616	5,546	5,496	-0.2	-0.2	-0.
Grain	- ,	3,182	3,086	2,946	2,846	-1.3	-0.6	-0.
0ilseeds 1/		121	100	100	100	+0.3	0	0
Potatoes		220	159	132	125	-2.9	-2.3	-1.
Forages <u>2</u> /		956	958	1,012	1,047	-1.0	+0.8	+0.
Other crops		1,153	1,313	1,356	1,378	+5.4	+0.4	+0.
Pasture		926	875	838	801	-0.7	-0.6	-0.
Meadows	: 504	445	411	336	268	-1.7	-2.4	-3.

See notes at end of table.

Continued

Appendix table 9--Distribution of Eastern Europe's agricultural land by type of use, averages 1956-60, 1961-65, and 1966-70, and projections to 1975 and 1980--continued

	: :		•	:	:	: Av. annua	1 rates o	fgrowth
Country and land use	1956-60	1961-65	: 1966-70	: 1975	: 1980	: 1956-60 :	1966-70	•
country and rand doc	: 1,50 00 :	1701 03	: 1,000 70	: 1973	: 1700	: to :		: 1975 - 80
	: :		•	:	:	: 1966-70 :	1975	:
	:	1 00	2.1				ъ.	
	:	1,000) hectares				Percent	
Romania:	•							
Agricultural land	: 14,393	14,709	14,909	14,769	14,669	0.3	-0.1	-0.1
Arable land		10,466	10,529	10,389	10,289	0.3	-0.2	-0.2
Grain		6,772	6,525	5,957	5,596	-1.1	-1.2	-1.2
Oilseeds 1/	: 385	452	521	648	730	+3.0	+3.1	+2.5
Potatoes	: 272	303	306	308	311	+1.2	+0.1	+0.2
Forages <u>2</u> /	: 1,093	1,330	1,320	1,533	1,673	+1.9	+2.1	+1.7
Other crops		1,609	1,857	1,943	1,979	+4.9	+0.6	+0.3
Pasture		1,379	1,397	1,400	1,400	+0.1	0	0
Meadows	: 2,791	2,864	2,983	2,980	2,980	+0.7	0	0
V. and lovi ex	:							
Yugoslavia:	: 14,940	14,821	14,667	14,447	14,302	-0.2	-0.2	-0.2
Agricultural land Arable land		8,349	8,244	8,174	8,126	-0.2	-0.2	-0.2
Grain		5,362	5,132	4,875	4,704	-0.7	-0.7	-0.7
Oilseeds 1/	•	130	180	238	281	+7.8	+4.0	+3.4
Potatoes		311	331	330	330	+1.6	0	0
Forages 2/		560	618	701	758	+3.6	+1.8	+1.6
Other crops		1,986	1,983	2,030	2,053	-0.1	+0.3	+0.2
Pasture		4,532	4,485	4,336	4,239	-0.5	-0.4	-0.4
Meadows		1,940	1,937	1,937	1,937	-0.1	0	0
	:							
Northern countries:	:							
Agricultural land		33,723	33,027	32,619	32,339	-0.3	-0.1	-0.2
Arable land		26,306	25,590	25,208	24,948	-0.4	-0.1	-0.2
Grain		13,428	13,350	13,536	13,549	-0.7 +5.0	-0.1 +0.1	0 -0.4
Oilseeds 1/		382	434 3,770	440 3,436	432 3,180	-0.8	-1.2	-1.4
Potatoes		4,065	4,729	4,950	5,134	+2.3	+0.7	+0.8
Forages 2/		4,390 4,041	3,307	2,852	2,653	-1.9	-1.9	-1.4
Other crops Pasture		3,088	3,065	3,159	3,227	0	+0.4	+0.4
Meadows		4,330	4,373	4,252	4,164	ő	-0.4	-0.4
neadows	: 4,303	7,330	4,3/3	7,232	4,104	Ü	0.,	01,
Southern countries:	:							
Agricultural land	: 42,110	42,257	42,393	41,763	41,434	0	-0.1	-0.2
Arable land	: 28,849	29,012	28,941	28,586	28,343	0	-0.1	-0.2
Grain	: 19,055	17,715	16,964	15,966	15,312	-1.0	-0.8	-0.8
0ilseeds $1/\dots$: 779	963	1,074	1,261	1,386	+4.2	+2.3	+1.9
Potatoes		875	828	792	786	0	-0.6	-0.2
Forages <u>2</u> /		3,531	3,553	3,966	4,248	+0.9	+1.6	+1.4
Other crops		5,928	6,522	6,601	6,611	+2.7	+0.2	0
Pasture	,	7,737	7,870	7,684	7,545	+0.1	-0.3	-0.4
Meadows	: 5,455	5,508	5,582	5,493	5,417	+0.2	-0.3	-0.2
Total Eastern Europe:	:							
Agricultural land		75,980	75,420	74,382	73,773	-0.1	-0.1	-0.2
Arable land		55,318	54,524	53,794	53,291	-0.2	-0.1	-0.2
Grain		31,143	30,314	29,502	28,861	-0.9	-0.4	-0.4
Oilseeds 1/		1,345	1,508	1,701	1,818	+4.1	+1.3	+1.4
Potatoes	•	4,940	4,594	4,228	3,966	-0.8	-1.1	-1.2
Forages 2/		7,921	8,282	8,916	9,382	+1.7	+1.1	-1.0
Other crops		9,969	9,829	9,453	9,264	+0.8	-0.4	-0.4
Pasture		10,825	10,935	10,843	10,772	+0.1	-0.1	-0.2
Meadows		9,838	9,955	9,745	9,581	+0.1	-0.3	-0.4
	:							

/ Sunflower seed, rapeseed, and soybeans only. 2/ Fodder beets, corn for silage and green feed, and perennial and annual grass for hay. Sources: $(\underline{6}, \underline{9}, \underline{13}, \underline{18}, \underline{19}, \underline{37}, \underline{52}, \underline{73}, \underline{74})$.

Appendix table 10--Average rainfall and soil moisture in Eastern Europe

Month ,	:Rainfal]	Rainfall: Soil Soil Soil Moisture	Rainfall	Soil Moisture	Rainfall	Soil Soil Soil Soil Soil Soil Moisture Mainfall Moisture	:ainfall:	Soil Moisture	Rainfall	Soil Moisture	: :Rainfal] :	Rainfall; Moisture; Rainfall; Moisture	Rainfall	Soil Moistu
							Millimeters	eters						
September	: 51	105	51	78	67	74	37	44	99	61	52	52	59	57
October	54	126	20	93	41	82	55	89	63	88	65	73	79	98
November	67 :	161	43	126	39	110	54	107	52	130	04	107	52	124
December	: 48	193	20	170	38	147	48	145	47	160	35	132	47	159
January	. 42	200	48	197	32	182	43	179	35	183	33	158	39	183
February	38	200	37	200	59	195	37	190	33	195	29	173	35	185
	: 45	196	42	195	33	194	41	186	04	190	37	177	43	188
April	54	179	77	177	04	174	64	169	. 56	172	20	162	09	172
May	: 72	157	55	147	99	14,3	62	145	69	144	69	136	73	146
June		138	94	117	71	114	75	108	81	112	92	109	85	110
July	. 92	118	81	96	87	76	54	89	99	9/	9/	77	61	72
August	80	109	71	87	72	83	41	77	56	56	54	56	59	54

Source: (18).

Appendix table 11--East European prices for grains in local currencies, 1966-70 averages per quintal

West Germany	Marks	07	37	36	NA
Italy	1,000 lire	9.9	0.9	NA	5.5
France : Italy	Francs	77	39	NA	41
Yugo- slavia	Dinars	93	NA	83	99
Hungary	Forints	286	257	230	217
Bulgaria	Leva	NA	NA	11	11
Poland	Zlotys	350	233	315	NA
East Germany	Marks	NA	NA	NA	NA
Grain : Czecho- East : Sloyakia : Germany	Crowns	169	154	164	156
Grain	•• ••	Wheat	Rye	Barley :	Corn

Sources: (5, 6, 19, 52, 74, 81).

Appendix table 12--Grain price indexes for Eastern Europe $\underline{1}/$ and selected West European countries, 1956-70

(1960 = 100)

Grain					:	:	:	: :	
and	. Czecno-	East	: Poland	Bulgaria	: Hungary	Yugo-	: France	: Italy :	West
year :	slovakia	Germany	:	3	:	slavia	: .	:	Germany
:				0					
Wheat:									
1956 :	88.5	84.3	72.5	NA	NA	83.0	100.2	101.4	98.8
1957 :	85.7	82.8	100.4	NA	91.4	99.1	77.7	102.2	102.4
1958 :	90.5	82.3	101.9	NA	91.0	97.3	89.4	93.1	103.4
1959		84.7	100.8	NA	96.1	95.2	97.3	94.9	104.2
1960		100.0	100.0	NA	100.0	100.0	100.0	100.0	100.0
	:	100.0	100.0	1421	100.0	100.0	100.0	100.0	100.0
1961		101.4	97.3	NA	100.8	128.3	105.5	97.2	102.4
1962		107.5	90.1	NA	101.7	122.1	111.3	100.4	103.7
1963		96.9	99.6	NA	101.7	135.8	102.8	102.8	103.6
1964 :		118.4	110.3	NA	102.6	169.5	103.8	101.9	105.2
1965		121.6	125.6	NA	102.6	266.3	105.8	101.4	103.6
	101 1	117 0	100 0	3.T. A	115 0	272.2	115 0	100 1	105 (
1966 :		117.8	129.8	NA	115.9	272.2	115.2	100.1	105.6
1967 :		118.7	130.9	NA	115.9	269.2	121.8	98.0	94.8
1968		121.4	134.3	NA	130.5	282.1	114.4	92.5	95.9
1969 :		119.8	137.8	NA	127.9	282.4	115.6	97.0	97.0
1970 :	128.4	120.1	134.3	NA	124.5	288.6	NA	NA	NA
Rye:				•					
1956 :		69.7	70.0	NA	NA	NA	91.3	109.8	104.1
1957 :	71.4	72.1	95.6	NA	81.7	NA	87.3	103.0	109.1
1958	78.1	77.6	104.4	NA	90.4	NA	92.4	97.7	106.9
1959	77.6	80.2	105.6	NA	95.2	NA	95.3	95.2	106.3
1960	: 100.0	100.0	100.0	NA	100.0	NA	100.0	100.0	100.0
	•								
1961 :		95.9	96.2	NA	101.4	NA	99.0	99.1	103.6
1962		95.6	93.7	NA	102.9	NA	117.3	118.9	107.4
1963		94.0	97.5	NA	102.9	NA	119.5	122.1	106.6-
1964		119.9	99.4	NA	104.8	NA	109.5	117.3	107.6
1965			128.1						
	: 105.4	122.6	120.1	NA	105.8	NA	118.9	119.9	106.6
1966		119.7	145.0	NA	118.7	NA	125.0	117.3	106.6
1967		120.8	140.0	NA	119.7	NA	131.6	116.3	97.4
1968		122.6	146.2	NA	127.9	NA	136.0	112.4	100.5
1969		120.7	149.4	NA	127.9	NA	131.7	115.6	101.8
1970		119.4	148.1	NA	124.5	NA	NA	NA	NA
	•								
Barley:		75.0	25 7	37.4	37.4	05.5	37.4	27.4	00 /
1956		75.9	35.7	NA	NA	85.5	NA	NA	99.4
1957		78.0	70.0	NA	102.4	90.7	NA	NA	98.9
1958		79.4	82.7	NA	NA	89.2	NA	NA	101.1
1959		91.9	93.5	NA	NA .	94.4	NA	NA	103.0
1960	: 100.0	100.0	100.0	100.0	100.0	100.0	NA	NA	100.0
	:								
1961		101.4	99.6	102.2	NA	110.5	NA	NA	101.3
1962	95.8	107.5	96.4	102.2	NA	127.2	NA	NA	107.6
1963		110.1	101.4	104.5	100.5	142.6	NA	NA	103.5
1964		111.9	96.4	103.4	98.0	183.6	NA	NA	105.8
1965		117.2	109.0	106.7	98.0	242.9	NA	NA	105.4
	:	,							
1966		114.3	106.1	119.1	97.6	252.2	NA	NA	104.0
1967		113.2	104.7	132.6	99.5	234.6	NA	NA	92.6
1968		112.5	122.4	129.2	125.4	258.6	NA	NA	96.6
1969									95.7
1969		113.7	123.5	NA NA	126.8	261.7	NA NA	NA NA	
		107.9	113.0	NA	122.4	277.2	NA	NA	NA
	:								

Appendix table 12--Grain price indexes for Fastern Europe $\underline{1}/$ and selected W=F Firepean countries, 1956-70--Continued

(1960 = 100)

Grain and year		Czecho- slovakia	East Germany	: : Poland :	: Bulgaria :	Hungary	Yugo- slavia	France	i Italv :	West
	:									
Corn:	:									
1956	:	NA	NΛ	NΑ	NA	NA	94.8	100.6	116.9	NA
1957	:	NA	NΛ	NA	NΛ	103.9	102.2	102.6	103.6	NA
1958	:	70.0	NA	NA	NΛ	98.9	93.1	110.6	104.2	NA
1959	:	69.9	NA	NΛ	NA	97.2	99.3	108.1	100.7	NA
1960	:	100.0	NΛ	NΛ	100.0	100.0	100.0	100.0	100.0	NΛ
	:									
1961		100.0	NA	NΛ	100.0	100.1	110.3	101.8	101.7	NA
1962	:	100.0	NA	NΛ	105.5	100.0	131.4	115.7	112.8	NA
1963	:	103.8	NA	NA	100.1	101.1	141.7	111.9	116.0	NA
1964	:	121.7	NA	NA	100.1	100.0	195.6	121.1	122.0	NΛ
1965	:	104.6	NΛ	NΛ	106.4	98.9	230.2	118.8	113.0	NA
1966	:	132.2	NA	NΛ	105.5	101.1	237.6	114.8	116.6	NΛ
1967	:	140.9	NA	NA	102.7	100.1	229.9	113.3	130.5	NΛ
1968	:	132.9	NA	NΛ	102.7	143.6	233.2	117.3	138.2	NΛ
1969			NA	NΛ	NA	140.2	230.6	119.3	142.4	NΛ
1970		138.3	NA	NΛ	NΛ	140.8	281.3	NΛ	NΛ	NΛ
	:									

^{1/} Romania excluded because data were not available.

Sources: $(\underline{5}, \underline{6}, \underline{19}, \underline{42}, \underline{43}, \underline{52}, \underline{74}, \underline{81}, \underline{84})$.

		Imports			Exports			Net trade	2/
Item	1956-60	: : 1961–65 :	1966-70	: 1956-60	1961–65	1966-70	: : 1956-60 :	: 1961-65	: 1966-70
				1	1,000 metric	tons			
			Meat		and meat products, and live	and live	animals		
Czechoslovakia: Beef and veal	22	41	30	1	т	12	-22	-38	-18
Pork	62	33		۳ 		- 5	-59	-26 -2	-59
Poultry meat Total $3/$	906	8	8 102	4	$\frac{2}{12}$	3 20	-5	<u>-6</u> <u>-72</u>	<u>-5</u> -82
East Germany: Beef and veal	100	76	47	1	;	19	-100	76-	-28
Pork	13	32	27	25	30	50	12	-2	23
Poultry meat Total 3/	$\frac{7}{120}$	$\frac{7}{133}$	4/77	25	30	<u></u>	-95	$-\frac{-7}{103}$	6 -
Poland:		ı	ı	((•	;	,
Beer and Veal Pork	12 12	20	7 7	8 - 1 8 - 1	32 137 	43 106 	-2 86 -1	25 117 	36 60 -
Poultry meat	17	<u></u>	 54	$\frac{12}{114}$	16 186	$\frac{16}{165}$	112 95	16 159	16 111
Bulgaria: Beef and veal	7 0	en (9 1	61	7 ,	17	'	Н,	∞ <u>ı</u>
Mutton and lamb Poultry meat Total 3/	7 4	. I I L	15 1 5	1 / 3 / 22	16 33 33 83	20 20 69	T2	13 4 4 26	15 20 54
See notes at end of table									Continued

Table A-13--Eastern Europe's trade in meat and meat products, and live animals, all in carcass-weight equivalent, 1/averese averages 1956-60, 1961-65, and 1966-70--Continued

: Net trade : : 1966-70 : 1956-60 : 1961-65 : : : : : : : : : : : : : : : : : : :	tons	and meat products, and live animals	$\frac{31}{14}$ $\frac{14}{60}$	68 28 30 22 5 18 4 5 98 33 53	29 26 7 4 66	
Exports : 1956-60 : 1961-65 :	1,000 metric tons	meat products,	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	28 30 5 18 5 13 1	29 76 28 62 7 8 4 3 68 149	
1966-70 : 1956		Meat and		3 1 1 2		
Imports:			17 14 1 32		- -	
1956-60			1 8 1 1 6		5 2	
Item		•	Hungary: Beef and veal Pork Mutton and lamb Poultry meat Total 3/	Romania: Beef and veal Pork Mutton and lamb Poultry meat Total 3/	Yugoslavia: Beef and veal Pork Mutton and lamb Poultry meat Total 3/	See notes at end of table.

Table A-13--Eastern Europe's trade in meat and meat products, and live animals, all in carcass-weight equivalent, 1/able A-13--Eastern Europe's trade in meat averages 1956-60, 1961-65, and 1966-70--Continued

		Imports			Exports			Net trade	2/
Item	1956-60	: 1961-65 :	1966-70	1956-60	: 1956-60 : 1961-65 :	: 1965-70	: : 1956-60 :	: 1961-65	: 1966-70
				1,00	1,000 metric tons	tons			
				Meat an	Meat and meat products	oducts			
Czechoslovakia: Beef and veal Pork Mutton and lamb Poultry meat Total 3/	22 57 85	40 30 2 8 80	30 62 100	3 1 2	24 2 8	6 5 14	- 22 - 55 	-38 -26 -26 -6	-24 -57 5 -86
East Germany: Beef and veal Pork Mutton and lamb Poultry meat Total 3/	94 13 7 114	91 28 7 7	45 27 75	25	7 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	45	-94 12 12 -1 -7	-91 -2 -7	-45 18 -4
Poland: Beef and veal Pork Mutton and lamb Poultry meat Total 3/	4 4 12 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	20 20 27	42 1 1 50	79 79 112:	22 116 16 155	24 105 16	-4 67 -1 12 75	15 96 128	17 63 -1 16 96
Bulgaria: Beef and veal Pork Mutton and lamb Poultry meat	7 7 1 1 7 7	7 1 3 3	9 2 1 1 51	17 17 20	2 8 1 8 7 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1	12 12 4 4 43	-2 15 16	12 5 1	-2 7 28 28 28
See notes at end of table.	•• (1)								Continued

Table A-13--Eastern Europe's trade in meat and meat products, and live animals, all in carcass-weight equivalent, 1/able A-13--Eostern Europe's trade in meat averages 1956-60, 1961-65, and 1966-70--Continued

		Imports			Exports		Z	Net trade 2	
Item	1956-60	: 1961–65 :	: 1966-70	: 1956-60	1961–65	: 1966-70	1956-60	: 1961–65	1966-70
				1,000	1,000 metric tons	ns			
	••			Meat and	Meat and meat products	lucts			
Hungary: Beef and vealPork		17	10	9 7	22	29	∞ α	1.5	19
Mutton and lamb Poultry meat Total 3/	9 1 6	32	2 2 39	14 39	29 77	1 1 44 106	14 30	12 -1 29 45	-1 44 66
Romania: Beef and veal Pork Mutton and lamb Poultry meat Total 3/			7 7	26 4 4 30	28 16 5 5	50 18 2 4 4	26	28 16 5 1	50 14 2 4 70
Yugoslavia: Beef and veal Pork Mutton and lamb Poultry meat Total 3/			10 10 10	11 26 3 4 44	59 62 4 4 128	76 34 4 4 115	11 26 3 4 44	59 62 4 4 128	76 24 4 4 105 Continued
									1

		Imports			Exports			Net trade	2/
Item	1956-60	1961-65	1966-70	: 1956-60	: : 1961–65	1966-70	1956-60	1961-65	: 1966-70
				1,000	1,000 metric tons	1S			
				I	Live animals				
Czechoslovakia: Cattle	2 2	1 8 1 4	7 5		3 1 4	9 9	-		9 5
East Germany: Cattle Hogs Sheep Poultry Total 3/	9 9	64 1 1	7 5		4 1 4	19 5 24	9 9	ñ ñ	17 5 5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Poland: CattleSheepSheepTotal 3/			4 4	2 19 	10 21 	19 1 	$\frac{2}{19}$	10 21 	19 3 16
Bulgaria: Cattle Hogs Sheep Poultry				2 2	2 8 4 14 14	10 8 8 8 	0 0	7	10 8 8 2 <u>6</u>
See notes at end of table.	٠								Continued

Table A-13--Eastern Europe's trade in meat and meat products, and live animals, all in carcass-weight equivalent, 1/able A-13--Eastern Europe's trade in meat averages 1956-60, 1961-65, and 1966-70--Continued

	1966-70			55 4 4 1 68	18 -1 -1 19	13 -3 14
Net trade $\frac{2}{2}$	1961–65		Live animals	31 7 4 4 42	3 1 5 5	17 -7 4
	: : 1956-60 :			23 7 1 29	3 1 1 1 2	18 22
	: 1966-70 :	: : : : : : : : : : : : : : : : : : :		55 4 4 6 1 1 8 6	18 2 2 2 23 23	15 3 19
Exports				31 7 4 6 7 7	3 2 2	17 4
	1956-60			23 7 7 29	3 1 2	18 2 4 4
	: : 1966-70				0 0	5 1 3 2
Imports	1961–65					
	1956-60					2 2
	Item			Hungary: Cattle	Romania: Cattle	Yugoslavia: Cattle

No sign on figure indicates net exports; a minus sign (-) indicates net imports. May not add due to rounding. $\frac{1}{2}$ / Excludes offals. $\frac{2}{3}$ / No sign on figure $\frac{3}{3}$ / May not add due t

Sources: (6, 9, 13, 19, 28, 37, 55, 60, 74, 81).

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